

THE FLORA OF DELHI

Handwritten:
Pondicherry
April 93

J. K. MAHESHWARI

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COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH
NEW DELHI

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FOREWORD

When I joined the University of Delhi as Professor of Botany in March 1949, my first requirement was naturally a "Flora of Delhi". None was in existence and even Duthie's "Flora of the Upper Gangetic Plain" was out of print. This seriously hampered the teaching and learning of botany. In the department we also received frequent requests from Hakims, Vaidyas, tradesmen and foreign visitors to identify various specimens from time to time. I, therefore, tried to find a student who would take up this job earnestly. Dr J. K. Maheshwari, who had taken his M.Sc. degree in botany in 1953, offered himself for this work and the C.S.I.R. responded by sanctioning a scheme of research on this topic. J. K. Maheshwari worked with great industry and enthusiasm for a little over three years and finally prepared a manuscript which won him the Ph.D. degree of the University of Delhi in 1957.

During the last few years this manuscript has been further revised and improved and in 1962 it was given to the C.S.I.R. for publication in book form. At the time of writing this Foreword, it is already in the page proof stage and should soon see the light of the day.

Dr J. K. Maheshwari has spared no pains in making this work as complete as possible and has provided many field notes which are based on personal experience. He has also tried to keep pace with the many changes in nomenclature that have come about in recent years since the publication of Hooker's "Flora of British India".

The arrangement of families generally follows Benthham and Hooker's system. English and local names have been given wherever possible for the benefit of agriculturists and others and there are useful notes on the local uses of the plants.

In spite of the care which Dr J. K. Maheshwari has exercised in every way, there are bound to be some errors and omissions. Dr Maheshwari will appreciate having these brought to his notice by the users of the Flora.

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Delhi-6
May 15, 1963

P. MAHESHWARI

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Grateful thanks are due to Shri M. B. Raizada, former Head of the Division of Forest Botany, Forest Research Institute, Dehra Dun, for the facilities provided to work in the F.R.I. herbarium and for help in identification of some specimens. I also place on record my sincere thanks and appreciation to Dr B. M. Johri, Reader in Botany, University of Delhi; late Shri A. Percy-Lancaster, former Director of Horticulture, Central Public Works Department, New Delhi; Sarvashri B. N. Sastri, K. Kashyapa, S. B. Deshaprabhu, and V. N. Chhibber of CSIR, New Delhi; the Director, Indian Meteorological Office, New Delhi; the Soil Conservation Officer, Delhi; the Superintending Engineer, Western Jamuna Canal, Delhi; and to the authorities of the Royal Botanic Gardens, Kew, England, and of Rashtrapati Bhavan Gardens, New Delhi, for their help in various ways.

I am much obliged to the Council of Scientific & Industrial Research, New Delhi, for a grant towards this investigation.

Central National Herbarium
Botanical Survey of India
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Howrah
April 30, 1963

J. K. MAHESHWARI

ABBREVIATIONS

For economy of space, the conventional abbreviations of some of the well known and more commonly cited books, periodicals, etc. have been further condensed as follows :

FBI	...	The Flora of British India by J. D. Hooker 7 vols., 1872-97. London.
FUGP.	...	Flora of the Upper Gangetic Plain and of the adjacent Siwalik and Sub-Himalayan Tracts by J. F. Duthie, 3 vols., 1903-29 (vol. 3, Pt. 3 by R. N. Parker ; index, 1952). Calcutta.
Gr.	...	A Catalogue of the Plants growing in Bombay and its vicinity by J. Graham, 1839. Bombay.
JASB.	...	Journal and Proceedings of the Asiatic Society of Bengal. Calcutta.
JBNHS.	...	Journal of the Bombay Natural History Society. Bombay.
JIBS.	...	Journal of Indian Botany, continued as Journal of the Indian Botanical Society. Madras.
JLS.	...	Journal of the Linnean Society (Botany). London.
Merr. Enum.	...	An Enumeration of Philippine Flowering Plants by E. D. Merrill, 4 vols., 1923-26. Manila.
Pfreich.	...	Das Pflanzenreich Regni Vegetabilis Cons- pectus, etc. by A. Engler, Hefte 1-102, 1900- 37. Leipzig.
RBSI.	...	Records of the Botanical Survey of India. Calcutta.
TLS.	...	Transactions of the Linnean Society of London (Botany). London.

Introduction

Although Delhi is the metropolitan seat of India, the flora of this State has remained practically unexplored. Delhi is visited by many Indians and foreigners, of whom several are interested in plants. Many of the plants in Indian floras do not possess scientific names which are considered valid in the light of the International Code of Botanical Nomenclature. Further, the identity of some plants has been found to differ from that mentioned in these floras. There is need, therefore, of a complete modern revision of the flora of this country. The present study was undertaken with this objective.

MAIN GEOGRAPHICAL FEATURES

Formerly a south-east division of the Punjab, Delhi State stretches along the western bank of the Jamuna River between $28^{\circ}12' - 28^{\circ}53'$ N. and $76^{\circ}50' - 77^{\circ}23'$ E. To the south-west lies the Thar desert which has always been a little too inhospitable to permit easy passage. To the north, at a not very far off distance, lie the lofty Himalayas. To the north-east lies the plain area on the Indo-Gangetic divide west of which are the plains of the Indus. Immediately to the south running in N.E.-S.W. direction is the Aravalli Range, the last tail end extension of which enters Delhi from Gurgaon; while to the east lie the fertile Gangetic plains. Delhi thus occupies a unique position in the form of a gateway between the Thar desert, Aravalli Range and the Himalayas. The tract is located in the north-west Indo-Gangetic alluvium, particularly the Jamuna alluvium. Considerable diversity of physical features occurs in the State. In fact the physical configuration of the country affected the routes in such a way that they tended to pass through this gateway, thus making Delhi the potential focus of routes from contrasting zones of physical environment. A branch of the Western Jamuna Canal (East Circle) drains through the district. The Western Jamuna Canal is the oldest irrigation system in the Punjab and takes off from the river Jamuna at Tajewala Head Works, about 241.4 km. from Delhi.

With the transfer of the metropolis from Calcutta to Delhi in 1912, a new minor province was created for administrative convenience covering an area of 1497 sq. km., out of which 1297 sq. km. are occupied by the Rural Area and the rest by Urban Area. Delhi State comprises a

long, narrow strip of territory along the Jamuna, which formed part of the Old Delhi district, and 65 trans-Jamuna villages, formerly in the Meerut district of Uttar Pradesh. The elevation of the State on the average ranges from 213-219 m. above sea level. The greatest length and breadth are 53 and 48 km. respectively. The area is bounded on the north by Karnal; on the east by the river Jamuna which separates it from the districts of Meerut and Bulandshahr in the Uttar Pradesh; on the south by Gurgaon and on the west by Rohtak.

New Delhi, about 8 km. from its centre to the south of Shahjehan's fort in Delhi, was first established in 1911 and occupies an area of 85 sq. km. It is situated on the great alluvial plain of the Jamuna sloping slightly from west to east. Radiating on all sides are broad, straight avenues with decorative trees and residential buildings with spacious lawns and pruned shrubbery. The main government buildings have been placed on the rock which is a spur of the main Delhi Ridge. Seen from the Ridge, the city appears to be surrounded by a dense grove of trees.

CLIMATE

Broadly speaking, the climate of Delhi is mainly influenced by its remote inland position and prevalence of air of continental character, which is characterized by extreme summer heat alternating with great winter cold. It is unfavourable for the growth of luxuriant vegetation. Only during the three monsoon months of July, August and September, oceanic air penetrates the country up to region of Delhi. The climate is of a semi-arid nature due to marked diurnal differences of temperature, high saturation deficit and moderately low rainfall. The desert area of Rajasthan to west and south-west and the Gangetic plains of Uttar Pradesh to east, across which the monsoon air travels and reaches Delhi, have their respective shares in affecting the climate of this region. Extreme dryness with an intensely hot summer and a cold winter are features which are associated with a sweep of air from a westerly or north-westerly direction, while the influx of air from the easterly or south-easterly direction usually causes increased humidity, cloudiness and precipitation.

The climate is markedly periodic and is characterized by a dry and increasingly hot season from March to June, a dry and cold winter from October to February and a warm, monsoon period from July to September. Corresponding to these, there are three distinct vegetational seasons. The climatic factors that appear to be of greatest importance are :

- Rainfall
- Temperature
- Relative humidity
- Wind

Thunder-storms, squalls, dust-storms, etc.

Hail-storms, fog, etc.

Rainfall. The arrival of the south-west monsoon in this part of India is regarded as a meteorological event of considerable importance. A study of this event revealed that the maximum number of occasions of onset of monsoon occurs in the first week of July and last week of June (Bhullar, 1952). The wettest period of the year is the last week of July, when the Najafgarh Drain and other ponds and puddles become filled with water. The normal annual rainfall at Delhi is 66.6 cm. of which nearly 80% is recorded during the period of three months from the middle of June to the middle of September. The remaining 20% of the annual rainfall seems to have slightly increased during recent years, as Hooker and Thomson (1855) gave the rainfall figure at Delhi as 54.6 cm. Considering the year as a whole, 90% of the days are rainless, the monthly distribution varying from the maximum number in October and November to the minimum number in July and August. The month of November is driest, during which only on one occasion in 3 years, a rainfall of 0.25 mm. was recorded at Delhi. The highest annual rainfall at Delhi was as high as 153 cm. in 1933, the next highest being 128 cm. recorded in 1862. The lowest annual rainfall was 20.6 cm. in 1868; other low amounts recorded being 29 cm. in 1928 and 26 cm. in 1929.

As a result of uncontrolled grazing and deforestation, rain has caused extensive soil erosion. Depressions and deep ravines have been formed on the hill slopes of Aravalli tail ends, near Mehrauli, in the Jamuna River basin and in the plains. Unless steps are soon taken to check the erosive action of rains, the gullies will encircle the fertile lands and render them unproductive.

Temperature. One of the most characteristic features of the climate of Delhi is the great extremes of temperature. The heat during the summer is intense and scorching, the temperature rising as high as 46°C . (June 19, 1939) during the month of June. On the other hand, the cold during the winter (December-February) is severe and the temperature goes down as low as -0.6°C . (January 1935). January is the coldest month of the year. In this month the mean maximum and mean minimum temperatures are lowest being 21.7° and 6.1°C . respectively. Moreover, in the rear of some of the winter disturbances, which traverse North India at this time of the year, the temperature sometimes reaches the freezing point. The month of February is slightly warmer and temperatures start rising by the middle of March. The hot season prevails during the period of April to June. The monthly mean temperature is highest in Delhi in June when the night temperature is also at its maximum, although the day temperature is highest in May.

Relative Humidity. Relative humidity is minimum in the dry weather months: April and May and maximum during the monsoon months: July, August and September. It is lowest in April-May and

highest in August. Examining seasonwise, the relative humidity during the cold season, December to February, is generally 61-71% in the morning hours and 31-38% in the afternoon hours. The higher mean values in June are due to the rains that occur towards the end of the month in association with the onset of the monsoon. The air is quite dry during the pre-monsoon season and in the afternoon hours humidity values approach 10%. In the rainy season, July to September, there is a marked rise in humidity, showing a maximum of 80% in the morning and 61% in the afternoon during the month of August. The variation of relative humidity during the day is 30-36% in winter, 19-27% in summer and 19-30% in monsoon months. Although the highest temperature is reached in May and early June, heat is most trying during late June and early July when high temperature coupled with high humidity makes climatic conditions most oppressive. The periods of high relative humidity are optimum for plant growth, but it is the high temperature and low humidity that make conditions trying. Thus, with the increase of temperature, humidity decreases and under such conditions xerophytic species of plants survive.

Wind. Wind is an important climatic factor for Delhi. For most of the year, wind is mild with the mean velocity of 0.9-2 mps. Taking the year as a whole, the prevailing direction of wind during September to May is west to north-west. While the percentage of winds with westerly components is quite large during the rest of the year, easterly components predominate, particularly during the months of active monsoon. Winds are strongest in June and lightest in November. In the summer months, hot and dust-raising winds, popularly known as 'loo' are commonly experienced and may result in thunder-storms or dust-storms (andhi). The maximum velocity of wind that may be expected in Delhi State is about 31 mps.

Thunder-storms, Squalls, Dust-storms, etc. Thunder-storms form an important climatic feature of Delhi. They may occur at any time of the year, most favourite being the period between May and August. Some are associated with violent squalls, heavy rains and hail. Winds exceeding 9 mps, accompanied with rain or thundery conditions, are experienced six to seven times each month in July, August and September and on one or two occasions in February, March, May and June (Sinha & Sharma, 1953).

About 70% of the squalls or violent winds occur during the hot season (April-June); their frequency reaches a maximum in May (Bhalotra, 1954), and again decreases to almost nil in November. More than 70% of the squalls have peak speeds between 13 and 22 mps; 17-22 mps is the usual speed from March to July during which period most of the squalls occur. The severe squalls with peak speed of more than 22 mps are associated with dust-storms and (or) thunder-storms. The highest wind velocity in association with dust-storms and thunder-storms during

1946-1950 was 31 mps recorded at 17.30 IST on May 20, 1950 (Sinha & Sharma, 1953).

Dust-laden high winds or gales occur commonly during summer in the arid and semi-arid regions of the earth, such as parts of China, Australia, Arabia, Persia and India. Mostly they occur during the day, commencing within a few hours of the sunrise and weakening usually in the afternoon a few hours before the sunset. These hot winds, aided by high temperature and low humidity, exert a very unhealthy and desiccating influence over the vegetation. The dust-storms are attended by powerful squalls of short duration ranging from a few minutes to half an hour or so, in which individual gusts may sometimes attain a velocity of 45 mps. At times the squalls may be so turbulent and the air so charged with dust that it brings about an Egyptian darkness irrespective of the hour of the day.

Hail-storms, Fog, etc. Hail-storms are rare in Delhi State. Taking the seasonal distribution they generally occur in January, February, April and May and to a lesser extent in March. Fogs are comparatively more frequent in the arid and semi-arid regions. In Delhi State they occur on one or two days in a month during December to February.

GEOLOGY

It is a known fact that the development and maturity of soils depend upon climate and geological formations. Since the composition and structure of the underlying rocks exercises a powerful influence on the growth of vegetation, a short account of the geology of rocks is presented below. The effect of rocks on surface vegetation is two-fold : (1) lithological and (2) structural. In the first case, the growth of vegetation at the surface is governed by the presence or absence of mineral elements in the rock. The second factor concerns the availability of mineral salts and water supply in a particular rock-bed, depending on its position.

The Aravalli Range of Rajputana, the oldest mountain chain of India, came into existence at the close of the Dharwar era. The Aravallis themselves are now no more than the stumps of a once lofty range. They reach their maximum height at Mount Abu (1722 m.) in the south-west, sink to low hills in the Jodhpur-Jaipur Saddle and rise again to the north-east. The last spur of the Aravallis reaches as far as the Ridge of Delhi. A large part of the tract lies in the alluvium, but small hills and ridges consist of outliers of Alwar Quartzites Series belonging to the Delhi system of transition group of Peninsular India. The Delhi system, probably of lower Cuddapah age (Wadia, 1953), is endowed with a variety of excellent building materials particularly the red sandstone which was so widely chosen for the construction of beautiful monuments and historic

The system appears to be a locally specialized type of the buildings. The system occupies a large extent of E. Rajputana country and extending from Delhi to Idar (Bombay State). It is composed of ferruginous and lime quartzites, grits and schistose rocks intruded by large bodies of granite and amphibolites. The Delhi Quartzites possess a vitreous lustre and a study of specimens reveals quartz and their incrustations of yellow metallic pyrites. They are found to contain 50% brown tourmaline, besides appreciable quartzites of colourless mica and limonite. The schistose rocks consist of biotite schists, phyllites and impure biotitic limestones. In and around Delhi rare occurrences of pegmatite are noticed. These are coarse, incoherent and loose, consisting chiefly of quartz, feldspar, minor amounts of biotitic mica and very small amounts of tourmaline. The reddish or brownish-red appearance of the hilly tracts may be due to a dehydrated form of iron oxide—turgite or haematite.

TOPOGRAPHY AND SOILS

There are four, well defined, natural, physiographic divisions of Delhi State, associated with which there are discrete aggregations of plants.

1. Khadar (Riverain zone)
2. Bangar (Area irrigated by wells and canals)
3. Dabar (Low-lying and rain-fed area)
4. Kohi or Pahari (Hillsides)

The sources of the parent materials of Delhi soils are : (a) local quartzites, (b) river borne alluvium (N. Sen, 1952), and (c) alluvium of aeolian origin (A. Sen, 1945 ; N. Sen, 1952).

A popular general description categorises Delhi soils as sandy loam Jamuna alluvium. The villagers distinguish three kinds of soils according to their degree of consistency. They are referred to as Dakar, Rausli and Bhur, which means a clayey loam, a half sand half clayey loam and a sandy loam tending towards sand respectively. The most prevalent type is Rausli in all the four physiographic regions. In general, the soils are coarse in texture, low in organic matter and nitrogen status. They come under the world group of grey or brown soils of desert and semi-desert regions. Topography plays an important part in the distribution of Delhi soils. In low-lying areas both salinity and alkalinity develop in the profiles, otherwise the soils are fairly well supplied in plant nutrients except nitrogen.

The saline and alkaline soils known locally as Kallar, Reh, Shor or Usar are absent in the Kohi area, but frequent in Khadar, Bangar and Dabar areas. Their formation is favoured by a semi-arid climate, impervious subsoil and temporary abundance of humidity in soil with alternate, dry spell. In the dry season moisture evaporates from the surface

layers of the soil and in time there forms an accumulation of saline substances which the scanty rainfall is insufficient to remove, while the saline solutions in the lower strata of soils ascend by capillarity, forming on evaporation a whitish alkaline efflorescence on the surface of the ground. As the degree of salinity of the soil increases, the vegetation diminishes and the ground develops a lustrous appearance. The chief salts are usually chlorides, sulphates and carbonates of sodium in varying proportions. Apart from the direct injurious effects of an abnormally large proportion of salts on plant life, the presence of salts makes the soil very impervious to water, so that in years of good rainfall patches of Kallar are superficially water-logged.

Khadar (Riverain Zone). It is a strip of land adjoining the river Jamuna and bounded on the other three sides by the Grand Trunk Road (West), the Civil Lines (South) and the boundary of the State (North). It is a low-lying tract covering an area of 30562 hectares, out of which only 38% is under cultivation. According to the District Gazetteer of Delhi (1883-1884), Khadar may be defined as soil which at some time or other lay either under the river or to the east of it. At what time and how the river changed its course is not known, but it is believed that the change was quite well marked. The Jamuna riverain has wide, sandy beds flanked by high banks and is subject to annual inundation. The river enters the State at a height of about 216 m. and leaves it at about 192 m. above sea level. The left bank of the river is used as a pasture ground and the right bank is liable to serious flooding. By a recurring deposit of the detritus and silt brought down by it from the Tertiary region of the outer Himalayas, the river raises its bed. However, during summer and winter months the river-bed in Delhi region is excavated and lot of silt is being removed annually.

The texture of the soil varies from coarse sand to clay and the clay content decreases with depth. The soils are base-saturated and their pH is on the alkaline side. They are low in organic matter most of which is confined to the top layers alone. Two important factors affecting crop yield in the area are high degree of salinity and water-logging. The soils belong to 'Solonchak' group (Raychaudhuri & Sankaram, 1952) and their position in the world group has been described as intrazonal, halomorphic, structureless and saline-alkali (Raychaudhuri & Tripathi, 1953).

Bangar (Area Irrigated by Wells and Canals). This is an area which in old times lay immediately to the west of river Jamuna. At present, the Western Jamuna Canal runs throughout its length and provides sufficient irrigation. The soils of Bangar are more fertile and productive than those of Khadar, being of a firmer consistency. Their texture is silty sand or loam. The erosion ratio of the soils is high showing a low resistance to erosion. In general, the pH of the surface and subsurface layers of this area is roundabout neutrality, though at some places it is

towards the alkaline side. In some parts well water is used for irrigation but it is saline in the majority of cases. Even a most casual glance would reveal large areas of this zone whitened or half whitened by a destructive saline efflorescence known as Usar, Reh, Shor or Kallar.

Dabar (Low-lying and Rain-fed Area). This area lies to the west of the hills and consists of low ground or basin scooped out by their westward drainage. Being low-lying it gets flooded during rainy season. In cold weather the greater part of the rainy season water is carried away by the Najafgarh Drain. The texture of the soil in the area is coarse and consists mostly of sandy loam. A considerable part of the surface is loose and soft due to regular cultivation but the subsoil mantle is invariably more compact. The NPK content of the soils is not adequate.

Kohi or Pahari (Hillsides). The area immediately south of Delhi, which includes the Ridge, Mehrauli, Tughlaqabad, Fatehpur Beri, Dera Mandi and other neighbouring urbans, is rocky and undulating. This low plateau, known as Kohi, consists mainly of bare, unconsolidated rocks. The area attains a height of 305-335 m. above sea level or about 90 m. above the alluvial plains of the Jamuna. Northwards its height gradually falls being only 2.5 m. above the plains.

A prolongation of the Aravalli Hills enters Delhi from Gurgaon on the southern border and immediately expands into a rocky tableland, about 5 km. in breadth. It runs in a north-easterly direction nearly across the district. Ten miles south of the city the range divides into two halves. One of these branching halves turns sharply to the south-west and re-enters the borders of Gurgaon. The other fork continues its northerly course as a low, narrow range of sandstones, passing west of New Delhi city where it forms the historic 'Ridge' and finally terminates through the notified area on the right bank of the Jamuna River at Wazirabad village. The Delhi Ridge is now divided into two parts, the northern portion being in Old Delhi and the southern in New Delhi. The greater portion of the Reserved Forest is located in New Delhi just opposite the Rashtrapati Bhavan at the back of the Birla Temple. The other wing of about 151 hectares extends from Sabzimandi to Khyber Pass passing along the University Road and opposite the Old Secretariat. Viewed from above, it appears to be a flat, tableland, but when ascended, it proves to be in detail very uneven, trenched by ramifying ravines which are separated by lower ridges representing slightly harder beds. Between these projecting ribs of rocks, there is frequently a fair amount of dry, sandy soil supporting thin grass and sparse scrubby bushes. Cultivation is practised only in a few patches. The humus content of the soil is low due to the sparse vegetation. The lower depressions possess slightly richer soil due to accumulation of water in rains and the washing down of the upper strata.

PREVIOUS BOTANICAL EXPLORATIONS

John Forbes Royle (1799-1858), an English armyman, was the pioneer plant explorer of Northern India and Himalayan Mountains. He had been destined for the Army in India and was already at the training college of Addiscombe when contact with A.T. Thomson (1788-1849), the pharmacologist, gave him so intense an interest in medicinal plants as to make him resolve on a medical career (Burkill, 1953). He succeeded Govan as Curator of the new Botanical Garden at Saharanpur in 1823, and, like his predecessors, combined the duties of a Surgeon with that of Superintendent of the garden. The results of Royle's work were published by him after his retirement in "Illustrations of the Botany and other branches of the Natural History of the Himalayan Mountains and of the Flora of Cashmere"—a work in 2 quarto volumes and with 100 plates, issued in eleven parts between September 1833 and 1840. The contents and dates of publication of different parts of this work have been ascertained by W. T. Stearn (1943). The introductory part of this work refers to a collection of at least 3,500 species. Recently Royle's herbarium, the whereabouts of which had been unknown since the eighteen-fifties, was rediscovered in Liverpool when the Liverpool Museums received as a gift the whole of the contents of the museum of the Liverpool Chemists' Association (Stansfield, 1953, 1954, 1957). Besides, Royle presented a set of his plants to the Linnean Society and a similar set was sent to J. D. Hooker for examination and comparison; many of these plants are now housed at the Royal Botanic Gardens, Kew, England. J. F. Duthie in 1876 found some bundles of Royle's plants at Saharanpur and these have been preserved at Dehra Dun. A perusal of Royle's "Illustrations" shows that the work is not so much a descriptive systematic flora as an attempt to ascertain the geographical distribution of plants in relation to climate and elevation and their uses. Hooker f. and Thomson in the introductory essay to their *Flora Indica* complement Royle as the pioneer to establish a floral affinity between the vegetation of the eastern and western continents of the Old World. While on a botanic mission from Saharanpur to the Himalayan Mountains and Kashmir, Royle and his collectors spent a good deal of time in Delhi. Thus, in front of 55 species of plants in his book, there are comments like 'in the neighbourhood of Delhi', 'as far as Delhi', 'between Saharanpur and Delhi', etc.

In his book entitled "Punjab Plants" (1869), J. L. Stewart, the late Conservator of Punjab Forests, gives the botanical and vernacular names and uses of economically important trees, shrubs and herbs occurring within the Province. He records 24 species of plants from or about Delhi district. However, this book has its importance more from a druggist's point of view.

J. F. Duthie (1845-1922), Superintendent of the Botanical Garden at Saharanpur, wrote "Flora of the Upper Gangetic Plain and of the ad-

adjacent Siwalik and Sub-Himalayan tracts" (Families Ranunculaceae to Juncaceae), which appeared in 5 parts between 1903-1920. The families Palmae to Aroideae and Alismaceae were completed by him before his death in 1922; these and the rest up to Cyperaceae were published by R. N. Parker and W. B. Turrill in 1929. Till today, Duthie's Flora enjoys the repute of being an important reference book for plants of the north Indian plains, although many of the plant names are not correct now according to the rules of the International Code of Botanical Nomenclature. At a number of places he mentions the occurrence of plants in or about Delhi, on the basis of collections made by himself or Royle, Jacquemont, Falconer, T. Thomson, Edgeworth, Vicary, Munro, C. B. Clarke, Jameson and others. However, the plants from Delhi State are not so well represented in this flora.

Recently, M. B. Raizada (1935-1936, 1950) has published some supplements to Duthie's Flora adding some new, noteworthy or recently introduced plants. In a paper entitled "Grasses of the Upper Gangetic Plain and some aspects of their ecology" Raizada (1954) has enumerated 250 species of grasses belonging to about 100 genera.

R. N. Parker (1884-1958), Forest Botanist at F.R.I., Dehra Dun, published "A Forest Flora of the Punjab with Hazara and Delhi" in 1918. There, he mentions 35 species of wild and cultivated plants occurring in the district of Delhi. In a paper entitled "Afforestation of the Ridge at Delhi", Parker (1920) enumerates a list of 67 species of wild and planted trees and shrubs found on the Ridge. In the light of present explorations the number of plants reported is far from complete.

Among recent plant explorers Singh, H. (1945), working in the Botany Division of I.A.R.I., New Delhi, made some collections of economic plants occurring in Delhi Province and published a list of them. S. K. Mukherjee (1953) has published a list of plants of the Delhi Ridge with a note on the floral elements.

Among other botanists who have paid occasional visits or collected plants while they lived in Delhi, the following deserve special mention: Dr H. Falconer (1808-1865), a paleontologist and botanist, Superintendent of the Botanical Garden at Saharanpur; Major Vicary; M. P. Edgeworth (1812-1881), member of the Indian Civil Service and Commissioner for the settlement of the Punjab; W. Jameson (1815-1882), Superintendent of the Botanical Garden at Saharanpur, in succession to Dr H. Falconer; Victor Jacquemont (1801-1832); G. T. Vigne (1801-1863), a British traveller; C. E. O. Kuntze (1843-1907); and W. R. Mustoe, Superintendent of Agri-Horticultural Operations, New Delhi.

PRESENT STUDY

Methods. The present work is based on the results of four years of intensive study of plants in Delhi State. The area covered has been deli-

mitted by the state boundaries, although the vegetation of the neighbouring regions, now belonging to Uttar Pradesh and Punjab, has also been investigated to some extent.

For preparing an account of the different vegetation types found in Delhi State, excursions were undertaken twice a week during the first two years, 1953-1955 and later at least twice a month. The trips were arranged in such a way as to cover all the four topographical zones at regular intervals. As a result of this, it was possible to collect most of the plants in vegetative, flowering and fruiting states. In the course of the day's excursion, plenty of observations were entered in a rough exercise book and specimens were collected. All the specimens so far collected have been given field numbers in a consecutive order and these numbers entered simultaneously in the note-book give the field observations. The latter include the habit, habitat and height of the plant, subterranean organs, type of soil, colour of flowers, fruits and seeds, dimensions of leaves, flowers and fruits, scent of flowers, character of trunk and bark in the case of trees, associations, commonness and abundance of a particular species in the area and other peculiarities which cannot be described from pressed specimens. When the same plant was found in a different locality, new specimens were collected, pressed and numbered. An attempt was made in every case to identify the plants from fresh materials; those that could not be identified on the spot or in the laboratory, were preserved for future study. Such of the undetermined plants were studied in the Forest Research Institute Herbarium at Dehra Dun.

Difficulties Encountered in Field Work. The area, especially the Ridge of Delhi, abounds in thorny trees and shrubs. At places they form impenetrable masses and thus render the exploration work difficult. Some plants, e.g. *Mucuna prurita* Hook., locally known as Kaunch, possess fine, stiff bristles on the pods, which cause a very intense irritation on the skin and may thus become a nuisance. The fine bristles are often flying at spots near gardens and the local farmers and gardeners are well aware of this plant.

Snakes are met with on the Ridge as well as in the plains, often haunting the trees and shrubs. The period which immediately follows the rains up to October is the most unhealthy season in the year. During the hot summer months of May and June when temperature shoots up to 46°C. and hot, dry, dust-laden, high winds (loo) blow from the neighbouring Rajasthan desert, botanizing becomes rather trying.

Herbarium Work. The dried specimens poisoned with a saturated solution of mercuric chloride in rectified spirit, were mounted on thick, 40×25 cm. herbarium sheets. Small paper bags containing seeds and fruits were attached on the sheet. All such specimens were fully labelled on the right lower corner from the 'collector-book'. For further protection against future handling, a number of specimens were covered by cellophane paper.

DESCRIPTION OF THE VEGETATION TYPES

The Vegetation and Floristic Composition of the Ridge. The Ridge of Delhi and its neighbouring hilly tracts represent the characteristic, natural flora of the State, which is a tropical, thorny, secondary forest, commonly known as 'rakhs' or an arid, open, scrub forest. Such forests are widely distributed in the arid and semi-arid zones of the earth where the total rainfall ranges from 50-100 cm. The vegetation presents a very open appearance so that the trees and shrubs are widely spaced. The bulk of the vegetation consists of co-dominant, spinous shrubs and trees, capable of great drought resistance. It may be classified under two categories as follows: (1) the permanent vegetation occurring throughout the year, and (2) the temporary vegetation consisting of the annuals growing mainly during the short, rainy season.

Corresponding to these, the vegetation of the Ridge presents two distinct, seasonal aspects: (1) the summer and winter aspect when most of the trees and some of the shrubs flower and the soil is devoid of any ground cover, (2) the rainy season aspect when the vegetation is at its best and the soil which is otherwise bare between the trees and shrubs is covered by a vivid green carpet of temporary vegetation. The latter flower and fruit in a short time and disappear as soon as the surface layer of the soil dries up and winter sets in.

The permanent vegetation is xerophytic in character and shows various xeromorphic features such as a thick tomentum, succulence, stunted growth, coating of wax, thick cuticle, protected stomata, etc. The plants occur in open, clump formations with plenty of vacant spaces between trees and shrubs. Most of the woody species of the Ridge and those growing in similar arid regions regenerate vegetatively by throwing out root suckers and coppicing shoots and some propagate even by natural layering. Unless the stumps and roots are grubbed out, the thorny forest tends to maintain itself by producing root suckers and coppicing shoots. These features appear to be common in dry situations. The noteworthy examples are: *Prosopis spicigera* Linn., *Acacia* spp., *Butea monosperma* Taub., *Balanites roxburghii* Planch., *Grewia tenax* Fiori, *Capparis decidua* Edgew., *Zizyphus nummularia* Wt. & Arn., and *Anogeissus pendula* Edgew. The trees comprising the perennial vegetation of the Ridge are both indigenous and introduced. The former are represented chiefly by *Prosopis spicigera* Linn., *Acacia leucophloea* Willd., *A. modesta* Wall., *A. senegal* Willd., *A. arabica* Willd., *A. catechu* Willd., *Butea monosperma* Taub., *Anogeissus pendula* Edgew., *Salvadora persica* Linn., *S. oleoides* Decne., *Wrightia tinctoria* R Br., *Cordia dichotoma* Forst. f., *C. rothii* Roem & Schult., *Ehretia laevis* Roxb., *Tecomella undulata* Seem., *Zizyphus mauritiana* Lamk. and *Balanites roxburghii* Planch. Among the latter, the most noteworthy example is *Prosopis juliflora* DC., an evergreen, spiny small tree, native of the arid regions of Mexico and

Central America. It was first introduced into India in 1877 from England. It is very common on the Ridge and has become a part and parcel of the native flora. Other successfully introduced trees are *Azadirachta indica* Juss., whose self-sown seedlings are common, *Feronia limonia* Swingle occurring in a semi-wild state, *Dalbergia sissoo* Roxb., *Parkinsonia aculeata* Linn., *Cassia fistula* Linn., *Albizzia lebbbeck* Benth., *A. amara* Boiv., *Crataeva nurvala* Buch.-Ham., *Mitragyna parvifolia* Korth., *Holoptelea integrifolia* Planch., and *Prosopis glandulosa* Torr. Among the shrubs, *Jatropha gossypifolia* Linn., native of Brazil, and *Opuntia dillenii* Haw., native of S. America, have become naturalized on the Ridge.

The thorny shrubs occur in widely spaced clumps supporting a number of twiners and climbers. Of these *Capparis sepiaria* Linn. is very common and abundant, growing alone or associated with *Grewia tenax* Fiori, *Securinega leucopyrus* Muell.-Arg., *Carissa spinarum* Linn., *Flacourtia indica* Merr., *Maytenus senegalensis* Exell, *Clerodendrum philomidis* Linn. f., and *Capparis decidua* Edgew. Other shrubs met in localized, isolated patches include *Dichrostachys cinerea* Wt. & Arn., *Mimosa hamata* Willd., and *Diospyros cordifolia* Roxb. There are no epiphytes in a thorny, scrub forest because of adverse climate but few lianas like *Maerua arenaria* var. *scabra* Hook. f. & Thoms., and *Cryptostegia grandiflora* R. Br. are known to occur on the common trees. A very common and gregarious undershrub *Adhatoda vasica* Nees, grows as a co-dominant with *Capparis sepiaria* Linn. It flowers from December to March and adds to the winter aspect of the Ridge. The plant is less subject to biotic influences, as no animal will eat it and hence it is spreading successfully on the Ridge as well as on the barren hillocks of Anand Parbat (Kala Pahar) and Mehrauli, where only a few other plants grow. Other undershrubs which come into vigour and growth after the rains are *Indigofera tinctoria* Linn., *I. astragalina* DC., *Tephrosia purpurea* Pers., *T. villosa* Pers., *Hibiscus micranthus* Linn. f., and *Ocimum americanum* Linn.

The Faridabad-Gurgaon hillocks are dominated by *Anogeissus pendula* Edgew., and *Butea monosperma* Taub., although other trees and shrubs like *Acacia leucophloea* Willd., *Prosopis spicigera* Linn., *Grewia tenax* Fiori, *Balanites roxburghii* Planch., *Wrightia tinctoria* R. Br., and *Dalbergia sissoo* Roxb. are also common. In the interior areas near Suraj Kund, about 3 km. from Gurukul, Faridabad, *Butea monosperma* Taub. forms a small forest of its own. It is heavily denuded of its foliage by villagers. *Balanites roxburghii* Planch. is common on the Ridge near Kitchener Road, forming often a pure family of trees.

A marked change is induced by the monsoon when the Ridge wears a new cloak of green and the whole ground becomes carpeted with a variety of herbs which cover the surface with a vivid green. These plants complete their life history in three to four months after the rains. They help in increasing the humus content of the soil and extending the vegetation to barren areas. The commonest and most successful annuals belong

to the families *Amaranthaceae*, *Tiliaceae*, *Capparidaceae*, *Papilionaceae*, *Compositae*, *Convolvulaceae*, *Pedaliaceae*, *Acanthaceae*, *Commelinaceae*, *Cyperaceae* and *Gramineae*. Among them the most common annuals are: *Triumfetta rhomboidea* Jacq., *Corchorus aestuans* Linn., *Tribulus terrestris* Linn., *Cleome viscosa* Linn., *Trianthema portulacastrum* Linn., *Vernonia cinerea* Less., *Bidens biternata* Merr. & Sherff, *Blainvillea latifolia* DC., *Trichodesma amplexicaule* Roth, *Sesamum indicum* Linn., *Martynia annua* Linn., *Elytraria acaulis* Lindau, *Peristrophe bicalyculata* Nees, *Justicia simplex* Don, *Boerhavia diffusa* Linn., *Digera alternifolia* Aschers., *Achyranthes aspera* var. *porphyristachya* Hook. f., *Pupalia lappacea* Juss., *Euphorbia hirta* Linn., *Phyllanthus fraternus* Webster, *Asphodelus tenuifolius* Cav., *Commelina forskalii* Vahl, *C. benghalensis* Linn., *Cyperus rotundus* Linn., *C. triceps* Endl., *C. compressus* Linn., *C. bulbosus* Vahl, *Eremopogon strictus* Camus, *Heteropogon contortus* Roem. & Schult., *Melanocenchris jacquemontii* Jaub. & Spach, *Cenchrus setigerus* Vahl, *C. ciliaris* Linn., *Setaria verticillata* Beauv., *Tragus biflorus* Schult., *Oropetium thomaeum* Trin., *Eragrostis poaeoides* Beauv., *E. cilianensis* Link, *Digitaria setigera* Roth, *D. adscendens* Henr., *Eleusine verticillata* Roxb., *E. compressa* Aschers. & Schwfth., *Dichanthium annulatum* Stapf, *Brachiaria ramosa* Stapf, *Tetrapogon tenellus* Chiov., *Dactyloctenium aegyptium* Beauv., *Aristida adscensionis* Linn., *A. hystrix* Linn. f., *Chrysopogon fulvus* Chiov., *Sporobolus diander* Beauv. Besides, a number of annual and perennial twiners and climbers belonging to the *Convolvulaceae*, *Asclepiadaceae*, *Cucurbitaceae*, *Papilionaceae* and *Vitaceae* add to the rainy season aspect of the Ridge. Among the commoner are: *Ipomoea pilosa* Sweet, *I. pentaphylla* Jacq., *I. pes-tigridis* Linn., *I. nil* Roth, *I. sindica* Stapf, *Rivea hypocrateriformis* Choisy, *Trichosanthes cucumerina* Linn., *Coccinia cordifolia* Cogn., *Melothria maderaspatana* Cogn., *Cayratia carnosa* Gagnep., *Rhynchosia minima* DC., *Cryptostegia grandiflora* R. Br., *Pergularia daemia* Blatt. & McC., *Telosma pallida* Craib, and *Pentstemon spiralis* Decne.

In areas where the soil consists of gravel or a thin, superficial mantle of soil over the rock, *Oropetium thomaeum* Trin. forms a dense, tufted growth, in association with *Riccia* sp. and moss. All these form a pioneer plant community on the parent rock. As the soil dries up, *Riccia* sp. dies leaving black patches after which this grass is seen in a fruiting condition either alone or associated with *Cyperus triceps* Endl., *Melanocenchris jacquemontii* Jaub. & Spach, and others. *Sesamum indicum* Linn., cultivated in the plains for its oil, has become naturalized on the Ridge along roadsides and amongst the thorny bushes and shrubs, but the seeds produced are much harder than those of the cultivated types. Amongst introduced weeds, *Martynia annua* Linn. and *Xanthium strumarium* Linn. thrive commonly in depressed areas or more often along roadsides and paths. *Elytraria acaulis* Lindau, a scapigerous, rosette-leaved herb, grows commonly on the Ridge and adjacent hilly tracts

in open places and shades of bushes on gravelly or stony soil. Another member of the same family, *Andrographis echinoides* Nees, grows preferably amongst recently formed, reddish sandstones in depressed areas or in crevices of walls, flowering during winter months. Among monocotyledonous annuals *Commelina forskalii* Vahl, apparently a new record from the north Indian plains occurs commonly in sandy depressions and grows alone or associated with *C. benghalensis* Linn. Both these are elegant herbs with sky-blue or bluish-violet flowers and produce aerial and underground flowers. *Urginea Indica* Kunth, which may be referred as the 'rainy perennial' possesses underground bulbs and becomes visible above ground only during the rainy season when leaves preceded by the flowers during the summer, appear. Many of these herbaceous plants dry up on exposed situations but persist among the bushy shrubs and shades of trees, where the top soil is moist for a slightly longer period. There are also met some perennial weeds which occur almost all round the year, e.g. *Calotropis procera* R. Br., *Withania somnifera* Dunal, *Abutilon indicum* Sweet, and others. Among parasites *Dendrophthoe falcata* Ettings., a woody type, flowering during the winter months is the only one known from the Ridge on *Acacia leucophloea* Willd., *Ehretia laevis* Roxb., and *Dalbergia sissoo* Roxb.

Among recent introductions on the aeolian, sandy and silty soils of the Ridge, the following deserve mention: *Phyla nodiflora* Greene, *Alternanthera sessilis* DC., *A. pungens* H. B. & K., *Chenopodium ambrosioides* Linn., *Fagonia cretica* Linn., *Erigeron bonariensis* Linn., *Carthamus oxyacantha* Bieb., *Nicotiana plumbaginifolia* Viv., *Fimbristylis dichotoma* Vahl.

Biotic Interference and Degeneration of the Forest. In order to understand the present condition of the vegetation and to form some idea of the status of different communities, it is necessary to consider the existing vegetation in the light of the history of Delhi State. This site was a first marked by the legendary city of Indraprastha which is supposed to have flourished in the fifteenth century B.C. though it might have been there even earlier. Since then it has been a seat of considerable importance for many centuries. There have always been alien intrusions from the north-western side of the country and the newcomers, like the natives, sensed very well that the control of this nodal point was the key to the control of the country. They naturally strove to establish themselves at this gateway before they could assert their authority over the country.

It is probable that in the past the area immediately outside the city walls of Delhi was very different from the vegetational standpoint than what it is today. The present vegetation of the place reflects its shadow in the foregone rise and fall of ruling powers and decisive battles fought on its soils. So pronounced are its repercussions that the so called 'thorn scrub forest' is characterized by 'economically unsound' species of plants. As the original plant cover on the hills as well as in the plains had been

ruthlessly destroyed, the vegetation continuously retrograded to a more and more xerophytic condition. As stated by Champion (1936) the Aravalli Hills in Rajputana are characterized by the subsidiary edaphic type of dry, tropical forest (sub-type E-6-*Anogeissus pendula*). Delhi, Etawah and Ajmer are recorded by him to possess local patches of dry, deciduous forest as of the *Anogeissus pendula* sub-type. According to Parker (1920) the natural covering of the hills was undoubtedly a scrubby forest of *Anogeissus pendula* Edgew. and *Acacia senegal* Willd. In the present explorations *Anogeissus pendula* Edgew. was seen only in protected areas of the New Delhi Ridge opposite the Rashtrapati Bhavan and also on the Faridabad-Gurgaon hillocks. It appears that in the past as at present the tree was subject to heavy exploitation. The cattle eat the foliage on a large scale and the wood is used as fuel, so much so that the tree is already rare on the northern or Old Delhi Ridge and in the rocky area near Gurukul, Faridabad, it is reduced to a prostrate, scrubby shrub spreading on rocks and giving an entirely different appearance from plants growing in protected areas. If this biotic interference continues, there is real danger of the extermination of some of our native species. Already 3 species, viz. *Decaschistia crotonifolia* Wt. & Arn., *Hibiscus surattensis* Linn., and *Melhantha futteyporensis* Munro, collected by Royle in 1839, are not to be seen any longer. Presumably they have disappeared or now exist very rarely. Similarly Parker (1920) mentions that "plants like *Melhantha futteyporensis* Munro, *Grewia flavescens* Juss., *Sterculia urens* Roxb., *Boswellia serrata* Roxb., *Rhus mysurensis* Heyne, *Acacia catechu* Willd., and *Euphorbia nivulia* Buch.-Ham., which are now found commonly in Rajputana, are not found on the Ridge, though they doubtless once occurred". Three of these, namely *Grewia flavescens* Juss., *Rhus mysurensis* Heyne and *Acacia catechu* Willd., have been collected from the Ridge by me, although in isolated patches. Similarly *Dichrostachys cinerea* Wt. & Arn., *Mimosa hamata* Willd., and *Flacourtia indica* Merr., all characteristic of an arid, scrub forest, occur only in localized patches on the southern or New Delhi Ridge. These plants do not seem to spread to other parts of the forest. The Ridge has been cut down at several places for erecting buildings and is now inhabited. In view of this prolonged cutting and grazing to which the Ridge has been subjected, it is desirable to make a State park and sanctuary in which the native flora can be preserved.

Seasonal Vegetation. This includes those herbs and shrubs as well as weeds that are commonly met with in lawns, gardens, fields and unused ground. Corresponding to the three distinct seasons of the year, one comes across winter, rainy and summer season annuals that complete their life history within three to four months. The optimum temperature and moisture conditions for plant growth are obtained during the rainy season when the vegetation attains a luxuriant monsoon aspect. Following the first fall of rains towards the end of June or early July the almost

bare ground
mention
Trianthema
strigosum
pressum
A little
cultivated
a variety
Rubiaceae
peraceae
fruit in
sunshine
and cu

Corchorus
C. aestivus
C. tridactylus
C. olitorius
Triumfetta
Crotalaria
luxurans
Polycaea
Convolvulus
Cathartus
Solanum
Justicia
Leucaena
L. aspera
Borreria
Euphorbia
Crotalaria
Phyllanthus

A
lawn

Indigofera
I. emarginata
I. hirsuta
Tephrosia
Mimosa
Zorba
Alysicarpus
A. viciifolius

bare ground begins greening up in patches. Among the pioneer plants, mention may be made of *Tribulus terrestris* Linn., *Euphorbia hirta* Linn., *Trianthema portulacastrum* Linn., *T. goindia* Buch.-Ham., *Heliotropium pressum* Linn., *Brachiaria ramosa* Stapf, and *Cynodon dactylon* Pers. A little later, in about two or three weeks, the ruderal areas, fallow and cultivated fields as well as public lawns and parks become inhabited with a variety of plants belonging to the *Tiliaceae*, *Papilionaceae*, *Aizoaceae*, *peraceae* and *Gramineae*. Most of the species of this season flower and fruit in September when the sky gets cleared and provides longer hours of sunshine. The following are the common monsoon species in fallow and cultivated areas:

<i>Corchorus trilocularis</i> Linn.	<i>Digera alternifolia</i> Aschers.
<i>C. aestuans</i> Linn.	<i>Commelina forskalii</i> Vahl
<i>C. tridens</i> Linn.	<i>C. benghalensis</i> Linn.
<i>C. olitorius</i> Linn.	<i>Bulbostylis barbata</i> Cl.
<i>Triumfetta rhomboidea</i> Jacq.	<i>Perotis indica</i> Kuntze
<i>Crotalaria medicaginea</i> var.	<i>Cenchrus setigerus</i> Vahl
<i>luxurians</i> Hook. f.	<i>C. ciliaris</i> Linn.
<i>Polycarpaea corymbosa</i> Lamk.	<i>Aristida adscensionis</i> Linn.
<i>Convolvulus arvensis</i> Linn.	<i>Eleusine verticillata</i> Roxb.
<i>Catharanthus pusillus</i> G. Don	<i>Dactyloctenium aegyptium</i> Beauv.
<i>Solanum surattense</i> Burm. f.	<i>Eragrostis poaeoides</i> Beauv.
<i>Justicia diffusa</i> Willd.	<i>E. ciliaris</i> Link
<i>Leucas cephalotes</i> Spreng.	<i>E. pilosa</i> Beauv.
<i>L. aspera</i> Spreng.	<i>E. ciliaris</i> Link
<i>Borreria hispida</i> K. Schum.	<i>E. tenella</i> Roem. & Schult.
<i>Euphorbia hypericifolia</i> Linn.	<i>Digitaria setigera</i> Roth
<i>Croton bonplandianum</i> Baill.	<i>Sporobolus diander</i> Beauv.
<i>Phyllanthus fraternus</i> Webster	<i>Desmostachya bipinnata</i> Stapf
	<i>Celosia argentea</i> Linn.

Among the rainy season annuals which are met in waste places, on lawns and parks and along roadsides, the following deserve mention:

<i>Indigofera linifolia</i> Retz.	<i>Desmodium triflorum</i> DC.
<i>I. enneaphylla</i> Linn.	<i>Polygala erioptera</i> DC.
<i>I. hochstetteri</i> Baker	<i>Cassia occidentalis</i> Linn.
<i>Tephrosia strigosa</i> Santapau & Mahesh.	<i>C. tora</i> Linn.
<i>Zornia diphylla</i> Pers.	<i>Mollugo cerviana</i> Ser.
<i>Alysicarpus monilifer</i> DC.	<i>M. nudicaulis</i> Lamk.
<i>A. vaginalis</i> DC.	<i>Polygonum plebeium</i> R. Br.
	<i>Imperata cylindrica</i> Beauv.

Dipteracanthus prostratus Nees, occurs commonly in the shades of fencerows of gardens and neighbouring unused areas. *Boerhavia repanda* Willd. is common in the hedges of fruit orchards where it is often found straggling amongst the bushes. Besides, a number of twiners and climbers inhabit the trees and shrubs of gardens, lawns and hedges; the common ones are:

Cayratia carnosa Gagnep.
Melothria maderaspatana Cogn.
Trichosanthes cucumerina Linn.
Coccinia cordifolia Cogn.

Rhynchosia minima DC.
Mucuna pruriata Hook.
Pergularia daemia Blatt. & McC.
Leptadaenia reticulata Wt. & Arn.
Cardiospermum halicacabum Linn.

The rainy season vegetation disappears during the month of October with the same rapidity as it came during the rains. As the cold season ensues and temperature becomes low and top soil as well as atmosphere become dry, species of colder altitudes, elevated regions, or of European genera make their appearance; the common ones are:

Fumaria indica Pugsley
Coronopus didymus Sm.
Sisymbrium irio Linn.
Argemone mexicana Linn.
Vaccaria pyramidata Medik.
Stellaria media Vill.
Spergula arvensis Linn.
Melilotus alba Desr.
M. indica All.
Lathyrus aphaca Linn.
L. sativus Linn.
Medicago denticulata Willd.
Trigonella corniculata Linn.
T. incisa Benth.
Vicia hirsuta S. F. Gray
V. sativa Linn.
Sonchus arvensis Linn.
S. oleraceus Linn.
Launaea asplenifolia Hook. f.
Gnaphalium indicum Linn.
Cirsium arvense Scop.
Vernonia cinerea Less.

Vicia indica DC.
Cotula hemisphaerica Wall.
Bergia ammannioides Roxb.
Malva parviflora Linn.
Oxalis corniculata Linn.
O. martiana Zucc.
O. latifolia H. B. & K.
Potentilla supina Linn.
Anagallis arvensis Linn. subsp.
arvensis
Veronica anagallis-aquatica Linn.
V. agrestis Linn.
Mazus japonicus Kuntze
Salvia plebeia R. Br.
Rungia repens Nees
R. pectinata Nees
Rumex dentatus Linn.
Asphodelus tenuifolius Cav.
Lolium temulentum Linn.
Phalaris minor Retz.
Poa annua Linn.
Polypogon monspeliensis Desf.

As the weather warms up in March, seeds of several annual herbs and weeds, that lie dormant in soil throughout the rainy season and winter, now germinate and they successfully occupy the unused ground, lawns

and fields that remain fallow till the arrival of the monsoon. A number of these weeds grow abundantly and exhaust the soil. The plants during these dry months of the year show various xeromorphic features such as thorns, woolly tomentum or stellate hairs, coating of wax, thick cuticle, leathery foliage, etc. Further it is during this time that some of the recently introduced, alien plants bear flowers and fruits, e.g. *Gomphrena celosioides* Mart., *Alternanthera pungens* H. B. & K., *Chenopodium ambrosioides* Linn., *Carthamus oxyacantha* Bieb., and *Erigeron bonariensis* Linn. Below are enumerated the common herbs that appear about the middle of April and occupy the area till or up to the monsoon period

<i>Alhagi pseudalhagi</i> Desv.	<i>Euphorbia dracunculoides</i> Lamk
<i>Citrullus colocynthis</i> Schrad.	<i>Chrozophora parvifolia</i> Klotz
<i>Glinus lotoides</i> Linn.	<i>Gomphrena celosioides</i> Mart
<i>Erigeron bonariensis</i> Linn.	<i>Alternanthera pungens</i> H. B. & K
<i>Pulicaria crispa</i> Sch.-Bip.	<i>Heliotropium eichwaldi</i> Steud.
<i>Laggera aurita</i> Sch.-Bip.	<i>Cressa cretica</i> Linn.
<i>Pluchea lanceolata</i> Cl.	<i>Hemigraphis hirta</i> T. Anders.
<i>Volutarella ramosa</i> Santapau	<i>Phyla nodiflora</i> Greene
<i>Echinops echinatus</i> Roxb.	<i>Chenopodium ambrosioides</i> Linn.
<i>Carthamus oxyacantha</i> Bieb.	<i>Dichanthium annulatum</i> Stapf

Vegetation of Jamuna River, its Basin and Embankments. The Khadar or riverain tract as defined earlier is the area adjoining Jamuna River. Being a low-lying tract, it is subject to annual inundation. The 'new alluvium' thrown up by the river and submerged by annual floods for several feet each year, until raised above the surface of the water by successive deposits of silt, becomes covered in the first place by seedlings of *Tamarix troupii* Hole, and *T. dioica* Roxb., the former being more common than the latter. These soon establish themselves in a dense crop either in pure formations or mixed with *Alhagi pseudalhagi* Desv., and others. Such alluvial *Tamarix* forests are gradually disappearing from these tracts, as more and more area adjoining the river-bed is being brought under Bela plantations and cultivation.

During the monsoon period from July to October, the river assumes a violent appearance and brings down a lot of silt which raises its bed. As the water recedes during the winter months, a characteristic flora comprising of water-loving herbs and sedges and species of higher altitudes and colder region, is met with. On these muddy flats and muddy islands, the common species are as follows

<i>Riccia</i> sp	<i>Anagallis arvensis</i> Linn. subsp.
<i>Equisetum</i> sp	<i>arvensis</i>
<i>Marsilea minuta</i> Linn.	<i>Centaurium ramosissimum</i> Druce
<i>Ranunculus sceleratus</i> Linn.	<i>Verbascum chinense</i> Santapau

Lathyrus aphaca Linn.
Melilotus indica All.
Potentilla supina Linn.
Ammannia baccifera Linn.
Grangea maderaspatana Poir.
Conyza aegyptiaca Dryand.
Vicia vestita Benth. ex Hook. f.
V. indica DC.
Pulicaria crispata Sch.-Bip.
Gnaphalium indicum Linn.

Veronica anagallis-aquatica Linn.
Mazus japonicus Kuntze
Salvia plebeia R. Br.
Polygonum plebeium R. Br.
Juncus bufonius Linn.
Scirpus tuberosus Desf.
S. affinis Roth
Cyperus pygmaeus Roth.
Fimbristylis dichotoma Vahl
Polypogon monspeliensis Desf.
G. luteo-album subsp. *affine* Koster

Due to its poor water-holding capacity, the silt loses its moisture content and these muddy flats soon organize into temporary dunes. The following plants were recorded from the Jamuna Ravines near Delhi in Royle's time (1839) but have since then remained unnoticed :

Ranunculus aquatilis Linn.
Polygala telephioides Willd.

Pulicaria angustifolia DC.
Dicoma tomentosa Cass.

Anisochilus carnosus Wall.

Flora of Ponds, Lakes, Marshes, Canals and its Neighbourhood. The common habitats of the hydrophytes in the area are the canals of Najafgarh, temporary ponds near Shahdara, natural and artificial ponds, lakes and deserted wells, 'Baoris' and dirty water pools. The Najafgarh Drain and the distributaries of Hindan River as well as the fresh water ponds near Shahdara dry up during the hotter part of the year.

The Najafgarh Drain supports a rich hydrophytic flora. The following plant associations are recognizable :

1. SUBMERGED AQUATIC ASSOCIATION : *Chara* sp., *Nitella* sp., *Potamogeton crispus* Linn., *P. pectinatus* Linn., *Hydrilla verticillata* Royle, *Vallisneria spiralis* Linn., *Zannichellia palustris* Linn., and *Ceratophyllum demersum* Linn. These species grow at different depths, mostly rooted in the muddy or sandy bottom and forming tangled masses of vegetation.

2. ATTACHED FLOATING AQUATIC ASSOCIATION : *Marsilea minuta* Linn., *Nymphaea nouchali* Burm. f., *Potamogeton indicus* Roxb., *Jussiaea repens* Linn., and such amphibious herbs as *Ipomoea reptans* Poir., *Monochoria* sp. (*vaginalis* Presl ?), and *Sagittaria guayanensis* H. B. & K. All these plants are rooted in the mud.

3. FREE-FLOATING AQUATIC ASSOCIATION : This association is represented by algae like *Spirogyra* sp., ferns like *Azolla pinnata* R. Br., and angiosperms like *Lemna paucicostata* Hegel., *Spirodela polyrrhiza* Schleid., *Wolffia* sp., *Trapa bispinosa* Roxb., *Utricularia stellaris* var. *inflexa* Cl., *U. flexuosa* Vahl, and *Eichhornia crassipes* Solms. These are met during the months of September, October and November.

4. REED SWAMP ASSOCIATION: The margins of the canal are surrounded by a number of species of amphibious plants, which may occur in pure associations or societies of different species, forming a reed swamp association. It occurs on soft, wet mud or in water of half to one metre depth and is represented by *Typha angustata* Bory & Chamb., *Scirpus tuberosus* Desf., *Fimbristylis dichotoma* Vahl, *Cyperus alopecuroides* Rottb., *Echinochloa crusgalli* Beauv., and *Hemarthria compressa* R. Br.

Slightly away from the margins of the canal, there are found a number of annuals amongst the grasses and shades of larger plants, e.g. *Corchorus capsularis* Linn., *Tephrosia strigosa* Santapau & Mahesh., *Athagi pseudalghi* Desv., *Polycarpon prostratum* Pax, *Melochla corchorifolia* Linn., *Verbascum chinense* Santapau, *Polygonum plebeium* R. Br., *Pulicaria crispa* Sch.-Bip., *Grangea maderaspatana* Poir., *Trianthema govindia* Buch.-Ham., *Glinus oppositifolius* DC., *Achyranthes aspera* var. *porphyristachya* Hook. f., *Kochia indica* Wt., *Vetiveria zizanioides* Nash, *Urochloa panicoides* var. *pubescens* Bor, and *Sporobolus diander* Beauv.

The important crops grown along the canal belong to the Kharif season and are :

Pennisetum typhoides Stapf &
C. E. Hubb.
Sorghum vulgare Pers.
Zea mays Linn.

Oryza sativa Linn.
Saccharum officinarum Linn.
Crotalaria juncea Linn.
Cyamopsis tetragonoloba Taub.

Ruderal Formations. To this category belong different classes of plants which in one way or other owe their presence in the region to certain changes brought about by man, as in the preparation of areas for planting crops and deforestation. Wherever the forests have been destroyed in connection with agricultural activities leading to open lands, a mixed flora made up of weeds and weedy plants is noted. This characteristic ruderal flora occurs in open places where the soil is disturbed from time to time, in fallow fields, along trails and roads, waste places in and near settlements, old garden sites and cultivated lands. All such man-made habitats are very susceptible to invasion of a weed flora which quickly occupies such areas unless they are properly cared for.

1. ROADSIDE WEEDS: The following are the common species met preferably along roadsides :

Xanthium strumarium Linn.
Erigeron bonariensis Linn.
Laggera aurita Sch.-Bip.
Bhunea lacera DC.
Carthamus oxyacantha Bieb.
Crotalaria medicaginea Lamk.

Cassia tora Linn.
Solanum surattense Burm. f.
Chenopodium ambrosioides Linn.
Cannabis sativa Linn.
Amaranthus spinosus Linn.
Euphorbia prostrata Ait.

THE FLORA OF DELHI

Phaseolus trilobus Ait.

Argemone mexicana Linn.
Cassia occidentalis Linn.

2. WEEDS OF CULTIVATION : About two-third of the total area of the State is under cultivation. A number of weeds, unintentionally introduced together with seeds and seedlings of cultivated plants, grow on cultivated soil. Nearly all of these weeds are of tropical distribution and a majority of them belong to dicotyledonous families. Being aggressive in nature, having very viable seeds which are produced in great abundance and are well equipped for dissemination by wind, man and animals, these 'unwanted guests' quickly spread under cultural operations and exhaust the soil nutrients, thereby affecting crop growth. The discovery of selective weedicides is a promising step to check growth of weedy species of plants. The families *Amaranthaceae*, *Cyperaceae*, *Gramineae*, *Papilionaceae*, *Caesalpiniaceae*, *Euphorbiaceae*, *Filiaceae*, *Malvaceae*, *Convolvulaceae*, *Boraginaceae*, *Labiatae*, *Scrophulariaceae*, *Solanaceae*, *Rubiaceae*, *Compositae*, *Capparidaceae*, *Acanthaceae* and *Apocynaceae* are notably rich in weeds.

The typical weeds associated with the rainy season (Kharif) crops are listed below :

Digera alternifolia Aschers.
Celosia argentea Linn.
Leucas cephalotes Spreng.
L. urticaefolia R. Br.
Crotalaria medicaginea Lamk.
Rhynchosia capitata DC.
Aeschynomene indica Linn.
Oldenlandia corymbosa Linn.
O. aspera DC.
Borreria hispida K. Schum.
Trianthema portulacastrum Linn.
Gisekia pharnaceoides Linn.
Mollugo cerviana Ser.
Artemisia scoparia Waldst. & Kit.
Solanum surattense Burm. f.
Portulaca oleracea Linn.
Convolvulus arvensis Linn.
Bulbostylis barbata Cl.
Eleusine verticillata Roxb.
Sporobolus diander Beauv.

Cleome viscosa Linn.
Gynandropsis gynandra Briq.
Triumfetta rhomboidea Jacq.
Corchorus aestuans Linn.
C. trilocularis Linn.
C. tridens Linn.
C. oltorius Linn.
Catharanthus pusillus G. Don
Polycarpaea corymbosa Lamk.
Justicia diffusa Willd.
Heliotropium strigosum Willd.
Phyllanthus simplex Retz.
P. fraternus Webster
Euphorbia hypericifolia Linn.
E. dracunculoides Lamk.
Commelina forskalii Vahl
C. benghalensis Linn.
Cyperus iria Linn.
Echinochloa crusgalli Beauv.
Aristida adscensionis Linn.

Sorghum halepense Pers.

The common weeds associated with cold season (Rabi) crops are as follows :

<i>Fumaria indica</i> Pugsley	<i>Lathyrus sativus</i> Linn.
<i>Coronopus didymus</i> Sm.	<i>Orobanche aegyptiaca</i> Pers.
<i>Lepidium sativum</i> Linn.	<i>Sonchus arvensis</i> Linn.
<i>Vaccaria pyramidata</i> Medik.	<i>S. oleraceus</i> Linn.
<i>Stellaria media</i> Vill.	<i>Anagallis arvensis</i> Linn. subsp.
<i>Malva parviflora</i> Linn.	<i>arvensis</i>
<i>Melilotus alba</i> Desr.	<i>Antirrhinum orontium</i> Linn.
<i>M. indica</i> All.	<i>Asphodelus tenuifolius</i> Cav.
<i>Vicia hirsuta</i> S. F. Gray	<i>Phalaris minor</i> Retz.
<i>V. sativa</i> Linn.	<i>Polypogon monspeliensis</i> Desf.
<i>Lathyrus aphaca</i> Linn.	<i>Lolium temulentum</i> Linn.

3. WEEDS OF PADDY FIELDS These are species that naturally grow in water or marshy areas subject to periodic flooding. A number of them are very troublesome and hence frequently hand-pulled by the farmers the common ones are

<i>Ammannia senegalensis</i> Lamk.	<i>Monochoria</i> sp. (<i>vaginulis</i>
<i>A. paccifera</i> Linn.	Presl ?)
<i>Aeschynomene indica</i> Linn.	<i>Sagittaria guayanensis</i> H. B. & K.
<i>Sesbania bispinosa</i> Fawcett & Rendle	<i>Scirpus tuberosus</i> Desf.
<i>Vicia hirsuta</i> S. F. Gray	<i>Echinochloa crusgalli</i> Beauv.
<i>Jussiaea perennis</i> Brenan	<i>E. colonum</i> Link.
<i>Sphenoclea zeylanica</i> Gaertn.	<i>Hemarthria compressa</i> R. Br.
	<i>Paspalum distichum</i> Linn.
	<i>Hydrolea zeylanica</i> Vahl

Glossostigma spathulatum Arn., the smallest member of the family *Scrophulariaceae*, occurs on wet, muddy soil of the canal bank as well as in paddy fields.

4. ESCAPES A number of plants originally under cultivation in gardens and fields for food, fibre, vegetable or ornamental purposes are frequently met in ruderal areas, along canal banks and roadsides. Of these, several members of the *Cucurbitaceae* are notorious in establishing themselves as escapes in waste places and along roadsides and thrive without being further cared for.

The following plants cultivated for vegetable, fibre or oil crops are often met as escapes

<i>Lycopersicon esculentum</i> Mill.	<i>Sesamum indicum</i> Linn.
<i>Anethum graveolens</i> Linn.	<i>Trichosanthes dioica</i> Roxb.
<i>Coriandrum sativum</i> Linn.	<i>Luffa cylindrica</i> Roem.
<i>Spinacia oleracea</i> Linn.	<i>Cucumis melo</i> Linn.
<i>Crotalaria juncea</i> Linn.	<i>C. melo</i> var. <i>utilissimus</i> Duthie & Fuller

Linum usitatissimum Linn.*Cucurbita moschata* Duch.*Capsicum annuum* Linn.

Among the garden herbs and shrubs, the common escapes are :

Ruellia tuberosa Linn.
Verbena bipinnatifida Schau.
Gomphrena globosa Linn.
Tecoma stans H. B. & K.
Barleria cristata Linn.
B. cristata var. *dichotoma* Prain

Hymenatherum tenuifolium Cass.
Catharanthus roseus G. Don
Petunia sp.
Oxalis pes-caprae Linn.
Clitoria ternatea Linn.
Althaea rosea Cav.

Some characteristic formations include the vegetation of saline and alkaline lands and flora of the old walls, etc.

1. VEGETATION OF SALINE AND ALKALINE LANDS : As explained earlier, saline and alkaline patches sometimes covering large tracts, occur in the Khadar, Bangar and Dahar tracts. They are converted into swamps in the rainy season and into the deserts in the dry season. Such tracts are equally unfavourable to the native as well as introduced species, the principal exceptions to this being some members of the *Chenopodiaceae*. This family includes a number of lime-loving or salt-loving herbs, of which *Suaeda fruticosa* Forsk., *S. maritima* Dumort., and *Salsola baryoxma* Dandy, inhabit preferably the saline soils of the State and are often accompanied by the grass *Sporobolus marginatus* Hochst. Among them, *Suaeda fruticosa* Forsk. is the most abundant and gregarious on such soils forming a matted, herbaceous growth and dominating the vegetation. These plants are so characteristic of saline and alkaline lands that they can well serve as soil indicators. Besides, the following plants were also observed in association with the above, presumably in less saline and alkaline soils.

Kochia indica Wt.
Chenopodium album Linn.
Alhagi pseudalhagi Desv.
Polygonum plebeium R. Br.

Cressa cretica Linn.
Tamarix troupii Hole
Solanum surattense Burm. f.
Echinops echinatus Roxb.

Phyla nodiflora Greene

2. FLORA OF OLD WALLS, ANCIENT MONUMENTS AND ROCKY CREVICES OR FISSURES : Inhabiting the outer old, semi-demolished walls of ancient buildings and monuments near Nizamuddin, Mehrauli, Qutab and Tughlaqabad as well as on the city walls, there is well recognizable a wall association principally of *Kickxia ramosissima* Janchen, *Lindenbergia indica* Kuntze, *Boerhavia diffusa* Linn., *Corchorus depressus* Stocks, *Euphorbia hirta* Linn., *E. prostrata* Ait., *Vernonia cinerea* Less., *Tridax procumbens* Linn., *Tephrosia strigosa* Santapau & Mahesh. and seedlings of

Ficus religiosa Linn. and *F. benghalensis* Linn. Presumably the species of this peculiar habitat are lime-loving and therefore find the plaster of the old walls a favourable habitat. The ancient walls of forts and buildings as well as the cracks and fissures in them are simply loose rubble and not masonry, so that the roots establish a foothold below the crust of the wall. These plants may be accompanied by robust or small shrubs such as *Capparis decidua* Edgew., *Lythrum europaeum* Linn., *Solanum nigrum* Linn., *Chenopodium album* Linn., *Ficus benghalensis* Linn., and *F. religiosa* Linn. The species belonging to the latter group may cause damage by sending their roots deep down into the walls and producing cracks and fissures as they grow in thickness.

In addition, there are plants which grow luxuriantly in the crevices of rocks. The following occur on the Ridge and other neighbouring hilly tracts.

Corchorus depressus Stocks
Cassia pumila Lamk.
Borreria stricta K. Schum.
Vernonia cinerea Less.
Tridax procumbens Linn.
Heliotropium strigosum Willd.
Evolvulus alsinoides Linn.
Boerhavia diffusa Linn.

Nothosaerva brachiata Wt.
Euphorbia hirta Linn.
Phyllanthus simplex Retz.
Cyperus triceps Endl.
C. niveus Retz.
Oropetium thomacum Trin.
Aristida hystrix Linn. f.
Chrysopogon fulvus Chiov.

A number of plants grow amongst the rocky crevices of gardens, near canals, in the 'Kachha' stairs leading to wells and tanks near settlements, etc.

Youngia japonica DC. subsp.
japonica
Vernonia cinerea Less.
Convolvulus pluricaulis Choisy
Solanum nigrum Linn.
Lindenbergia indica Kuntze.

Cleome brachycarpa Vahl
Chenopodium album Linn.
Euphorbia prostrata Ait.
Phyllanthus fraternus Webster
Ficus religiosa Linn.
F. benghalensis Linn.

CULTURAL PLANT COMMUNITIES

Food Crops. The total land of Delhi State is 148032 hectares, of which 93227 hectares were sown during the year 1954-1955. Of the uncultivated area, 31922 hectares were not available for cultivation; 18438 hectares were other uncultivated land, and 4832 hectares were fallow lands for the year 1954-1955. The cultivation of the crops is determined by climate, soil and water facilities. Crops like rice that require plenty of water are grown in a very small area, but dry or rain-fed crops like millets

and cereals, occupy a larger area. The irrigation facilities are provided by the Delhi Canal of Western Jamuna Canal (East Circle). The agricultural year of the State includes two complete seasons

1. Kharif or rainy season, when a climate of tropical character develops. The pure or mixed crops are often grown with several edible legumes. The important ones are

Pennisetum typhoides Stapf & C. E. Hubb. (Pearl or Indian or bulrush millet)

Zea mays Linn. (Maize Indian corn)

Sorghum vulgare Pers. (Great millet Jowar)

Oryza sativa Linn. (Rice)

Gossypium herbaceum Linn. (Cotton)

G. arboreum Linn.

G. hirsutum Linn.

Hibiscus cannabinus Linn. (Roselle hemp)

Abelmoschus esculentus Moench (Lady's finger)

Crotalaria juncea Linn. (San hemp)

Cyamopsis tetragonoloba Taub. (Guar)

Phaseolus aconitifolius Jacq. (Moth bean)

P. mungo Linn. (Black gram Urd)

P. aureus Roxb. (Green gram Mung)

P. lunatus Linn. (Lima bean)

P. vulgaris Linn. (Kidney bean)

Vigna sinensis Savi (Cowpea)

Dolichos lablab Linn. (Hyacinth bean)

Cajanus cajan Millsp. (Pigeonpea)

Capsicum annum Linn. (Chilli)

Sesamum indicum Linn. (Sesame)

Sugarcane (*Saccharum officinarum* Linn.) is sown from January to April and cut during the following cold season.

2. The second agricultural year, viz. rabi (cold weather) season lasts from October to April. This season is well suited for the cultivation of crops of temperate countries. The important field crops of this season are

Triticum aestivum Linn. (Wheat)

Hordeum vulgare Linn. (Barley)

Avena sterilis Linn. var. *culta* (Oat)

Cicer arietinum Linn. (Gram)

Lens culinaris Medik. (Lentil)

Pisum sativum Linn. (Pea)

Trigonella foenum-graecum Linn. (Fenugreek)

Linum usitatissimum Linn. (Linseed Flax)

Brassica campestris var. *sarson* Prain (Sarson)

Garden Crops. A number of garden crops are sown a month earlier and these ripen in January and February, two months before the regular rabi harvest commences; the common ones are

- Lactuca sativa* Linn. (Lettuce)
- Helianthus tuberosus* Linn. (Jerusalem artichoke)
- Cynara scolymus* Linn. (Globe artichoke)
- Trachyspermum ammi* Sprague (Ajwain)
- Foeniculum vulgare* Mill. (Fennel)
- Anethum graveolens* Linn. (Dill; Sowa)
- Daucus carota* Linn. (Carrot)
- Coriandrum sativum* Linn. (Coriander)
- Cuminum cyminum* Linn. (Cumin; Zira)
- Raphanus sativus* Linn. (Radish)
- Brassica oleracea* var. *capitata* Linn. (Cabbage)
- B. oleracea* var. *botrytis* Linn. (Cauliflower and Broccoli)
- B. oleracea* var. *gemmifera* Zenker (Brussels sprouts)
- B. oleracea* var. *caulorapa* DC. (Knol-kohl)
- B. rapa* Linn. (Turnip)
- B. juncea* Czern. & Coss. (Leaf mustard)
- B. nigra* Koch (Black mustard)
- Pisum sativum* Linn. (Pea)
- Beta vulgaris* Linn. (Beet root)
- Spinacia oleracea* Linn. (Spinach)
- Dioscorea bulbifera* Linn. (Yam)
- Allium cepa* Linn. (Onion)
- A. sativum* Linn. (Garlic)
- Amorphophallus campanulatus* Bl. (Elephant foot yam)

During the summer months of April, May and June, the principal crops grown especially along the sandy banks of Jamuna River belong to the family *Cucurbitaceae*. Their fruits ripen in June and are commonly sold during these hot months in the bazaars of Delhi. The common ones are listed below

- Trichosanthes dioica* Roxb. (Palwal Parwal)
- T. anguina* Linn. (Snake gourd)
- Lagenaria vulgaris* Ser. (Bottle gourd)
- Luffa acutangula* Roxb. (Kali tori)
- L. cylindrica* Roem. (Ghia torai)
- Momordica charantia* Linn. (Bitter gourd)
- Cucumis melo* Linn. (Melon)
- C. melo* var. *momordica* Duthie & Fuller (Phunt Kachra)
- C. melo* var. *utilissimus* Duthie & Fuller (Kakri)
- Citrullus vulgaris* Schrad. (Water melon)

C. vulgaris var. *fastuosus* Duthie & Fuller (Tinda)
Cucurbita moschata Duch. (Pumpkin)

Fruit Plantations and their Wild Flora. As a result of the well known Delhi Canal System, distributary of the Western Jamuna Canal (East Circle) which flows through the fruit orchards, there are being maintained in the State some fruit orchards. According to the 'The Times of India Directory and Year Book (1956-57)' till recently Delhi had a large number of gardens but due to the pressure of populations and anti-malarial measures, the land of these gardens has been cleared off. It is well known that at one time in the 19th century Delhi Tail Distributary passed through Chandni Chowk but later large number of gardens were converted into *abadies* releasing good deal of irrigation water. The total area occupied by the gardens during the year 1954-55 was 1131 hectares. Now Delhi imports most of its fruits. The fruit orchards in the district are mainly located near Sahzmandi, Sarai Rohilla and along Karnal Road. The Shalimar Bagh of Mughal days, on the railway track from Delhi to Ambala has also been converted into a number of fruit gardens. Besides, there are isolated gardens in Shahdara, Mehrauli, etc. Most of the fruit orchards produce summer and rainy season fruits; the common ones are:

- Mangifera indica* Linn. (Mango)
- Spondias pinnata* Kurz (Hog plum)
- Manilkara hexandra* Dub. (Khirmi)
- Achras zapota* Linn. (Sapodilla)
- Grewia asiatica* Linn. (Phalsa)
- Psidium guajava* Linn. (Guava)
- Syzygium cumini* Skeels (Indian blackberry)
- Eriobotrya japonica* Lindl. (Loquat)
- Prunus persica* Stokes (Peach)
- P. domestica* subsp. *insititia* Schneid. (Alu bukhara)
- Pyrus pyrifolia* var. *culta* Nakai (Pear)
- Litchi chinensis* Sonner. (Litchi)
- Morus alba* Linn. (White mulberry)
- M. indica* Linn. (Indian mulberry)
- Artocarpus lakoocha* Roxb. (Monkey jack)
- A. heterophyllus* Lamk. (Jack-tree)
- Ficus glomerata* Roxb. (Cluster fig)
- Punica granatum* Linn. (Pomegranate)
- Citrus aurantium* Linn. (Sour or seville orange)
- C. maxima* Merr. (Pummelo; Shaddock)
- Cordia dichotoma* Forst. f. (Indian cherry)
- Pithecellobium dulce* Benth. (Manila tamarind)
- Musa paradisiaca* Linn. (Banana)

Among the winter season fruits may be mentioned :

Averrhoa carambola Linn. (Carambola)
Emblica officinalis Gaertn. (Emblie ; Myrobalan)
Zizyphus mauritiana Lamk. (Indian jujube)
Carica papaya Linn. (Papaya)
Tamarindus indica Linn. (Tamarind)
Cordia rothli Roem. & Schult. (Gondi)

1. HEDGE PLANTS : The hedge associations along the boundaries of plantations are partly artificial as they occur along the borders marked out by man. However, in the shades of one or more species, seeds of other plants find favourable conditions and grow along with them. The common hedge plants are :

<i>Capparis sepiaria</i> Linn.	<i>Acacia farnesiana</i> Willd.
<i>Diospyros cordifolia</i> Roxb.	<i>A. jacquemontii</i> Benth.
<i>Kirganelia reticulata</i> Baill.	<i>Pithecellobium dulce</i> Benth.
<i>Salvadora persica</i> Linn.	<i>Carissa spinarum</i> Linn.
<i>Dalbergia sissoo</i> Roxb.	<i>Ehretia laevis</i> Roxb.
<i>Mimosa rubicaulis</i> Lamk.	<i>Agave wightii</i> Dr. & Prain

2. CLIMBERS, TWINERS AND RAMBLERS : These are common only during the monsoon and post-monsoon period, often straggling amongst the hedge plants or on the fruit trees : the common ones are :

<i>Cissampelos pareira</i> Linn.	<i>Abrus precatorius</i> Linn.
<i>Cocculus hirsutus</i> Diels	<i>Rhynchosia minima</i> DC.
<i>Cayratia carnosa</i> Gagnep.	<i>Teramnus labialis</i> Spreng.
<i>Cardiospermum halicacabum</i> Linn.	<i>Mucuna pruriens</i> Hook.
<i>Trichosanthes cucumerina</i> Linn.	<i>Operculina turpethum</i> Silva
<i>Coccinia cordifolia</i> Cogn.	Manso
<i>Melothria maderaspatana</i> Cogn.	<i>Ipomoea nil</i> Roth
<i>Ichnocarpus frutescens</i> Ait. & Ait. f.	<i>I. cairica</i> Sweet
<i>Pergularia daemia</i> Blatt. & McC.	<i>Cuscuta reflexa</i> Roxb.
<i>Leptadaenia reticulata</i> Wt. & Arn.	<i>Boerhavia repanda</i> Willd.
<i>Dregea volubilis</i> Benth.	<i>Basella rubra</i> Linn.

3. PLANTS ALONG CANALS : A study of wild plants growing along the canal banks shows how far irrigation by the Western Jamuna Canal has modified the natural vegetation of these fruit orchards. The conditions for plant growth in this area are so favourable that a thick vegetation comprising of herbs, undershrubs and shrubs develops : the common ones are :

<i>Polygonum barbatum</i> Linn.	<i>Plumbago zeylanica</i> Linn.
subsp. <i>gracile</i> Danser	<i>Diospyros cordifolia</i> Roxb.

P. plebeium R. Br.
P. glabrum Willd.
Kirganelia reticulata Baill.
Phyllanthus fraternus Webster
Ficus palmata Forsk.
Oxalis corniculata Linn.
Toona ciliata Roem.
Desmodium gangeticum DC.
Centella asiatica Urb.
Oenanthe stolonifera Wall.
Rorippa indica Hiern
Malvastrum coromandelianum
 Garcke
Urena lobata Linn.
Triumfetta rhomboidea Jacq.
Youngia japonica DC. subsp.
japonica
Ageratum conyzoides Linn.

Bidens biternata Merr. & Sherff

Nicotiana plumbaginifolia Viv.
Hemigraphis hirta T. Anders.
Dipteracanthus prostratus Nees
Asteracantha longifolia Nees
Barleria cristata Linn.
B. cristata var. *dichotoma*
 Prain
Verbena officinalis Linn.
Anisomeles indica Kuntze
Plantago major Linn.
Aerva lanata Juss.
Carex sedia Nees
Hemarthria compressa R. Br.
Echinochloa crusgalli Beauv.
E. colonum Link
Paspalum distichum Linn.
Paspalidium flavidum A. Camus
Eriochloa procera Hubb.

4. THE GROUND FLORA OF FRUIT ORCHARDS : The special circumstances of this habitat brought about as a result of artificial irrigation are higher humidity and humus content, diffuse sunlight and a soil moistened by water from irrigation channels. Quite a large number of weeds, more or less delicate and shade-loving, are met with as herbaceous undergrowth in these gardens. It is a common feature to see that any one species completely dominates a particular area, forming a thick carpet of plants. Apart from these, many others have been and are being introduced from other countries and have become naturalized in the area. The common rainy season herbs are :

Triumfetta rhomboidea Jacq.
Urena lobata Linn.
Malvastrum coromandelianum
 Garcke
Zornia diphylla Pers.
Desmodium gangeticum DC.
Erigeron canadensis Linn.
E. bonariensis Linn.
Bidens biternata Merr. & Sherff

Cynoglossum lanceolatum Forsk.

Dipteracanthus prostratus Nees
Polygonum plebeium R. Br.
Phyllanthus fraternus Webster
Typhonium trilobatum Schott
Cyperus kyllingia Endl.
Imperata cylindrica Beauv.
Paspalidium flavidum A. Camus
Echinochloa colonum Link
Oplismenus burmannii Beauv.

The common cold season weeds are :

Coronopus didymus Sm.

Oxalis martiana Zucc.

Rorippa
Stellar
Sperg
Agera
Anaga
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CULTURAL PLANT COMMUNITIES

Rorippa indica Hiern
Stellaria media Vill.
Spergula arvensis Linn.
Ageratum conyzoides Linn.
Anagallis arvensis Linn. subsp.
arvensis
Nicotiana plumbaginifolia Viv.
Peristrophe bicalyculata Nees
Oxalis corniculata Linn.
O. latifolia H. B. & K.
Malvastrum coromandelianum
 Gateke
Blepharis maderaspatensis Heyne
Rungia pectinata Nees
Rumex dentatus Linn.
Aculeypha indica Linn.
Cannabis sativa Linn.
Optismenus compositus Beauv.

Rauvolfia serpentina Benth., occurs as a naturalized weed in some of the Sabzimandi Gardens. During the months of January and February it is replaced by *Ageratum conyzoides* Linn., which then completely dominates the ground flora. *Clerodendrum indicum* Kuntze, grows abundantly as a shrubby undergrowth in some areas of Gulab Bagh near Sabzimandi.

INTRODUCED FLORA OF THE STATE

Roadside and Avenue Trees. The city of New Delhi lies in a dense grove of trees. The common roadside trees are :

<i>Kigelia pinnata</i> DC	<i>Mangifera indica</i> Linn.
<i>Haplophragma adenophyllum</i> P	<i>Dalbergia sissoo</i> Roxb.
Dop	<i>Tamarindus indica</i> Linn.
<i>Millingtonia hortensis</i> Linn. f	<i>Cassia fistula</i> Linn.
<i>Ficus virens</i> Ait. var. <i>virens</i>	<i>Delonix regia</i> Raf.
<i>F. virens</i> var. <i>sublanceolata</i> Corner	<i>Albizia lebbek</i> Benth.
<i>F. microcarpa</i> Linn. f.	<i>Terminalia bellirica</i> Roxb.
<i>F. religiosa</i> Linn.	<i>T. arjuna</i> Wt. & Arn.
<i>Ailanthus excelsa</i> Roxb.	<i>Syzygium cumini</i> Skeels
	<i>Azadirachta indica</i> Juss.

The following trees and shrubs make fine avenues in gardens and parks

<i>Cupressus sempervirens</i> Linn.	<i>Mimusops elengi</i> Linn.
<i>Thuja orientalis</i> Linn.	<i>Roystonea regia</i> O. F. Cook
	<i>Polyalthia longifolia</i> Thw.

Trees and Shrubs of Public and Private Gardens, Lawns and Parks. The number of cultivated, ornamental and hedge plants, trees, shrubs and vines is very large. The majority of these are not native species but are exotics from Malagasy (Madagascar), South Africa, Tropical and

South America, Java, Malaya, Burma and China. The families *Magnoliaceae*, *Annonaceae*, *Bombacaceae*, *Sterculiaceae*, *Malpighiaceae*, *Rutaceae*, *Meliaceae*, *Anacardiaceae*, *Ochnaceae*, *Moringaceae*, *Caesalpinaceae*, *Rosaceae*, *Punicaceae*, *Myrtaceae*, *Combretaceae*, *Caprifoliaceae*, *Sapotaceae*, *Oleaceae*, *Loganiaceae*, *Bignoniaceae*, *Verbenaceae*, *Proteaceae*, *Nyctaginaceae*, *Moraceae*, *Casuarinaceae*, *Ulmaceae*, *Palmae*, *Pandanaceae*, *Agavaceae*, *Smilacaceae*, *Musaceae* and *Amaryllidaceae* are exclusively or commonly known from the area only in cultivation. An extensive use has been made of many of these flowering trees and shrubs for brightening up the housing areas, squares and circuses in New Delhi.

The common trees and shrubs planted in lawns, parks and gardens are :

<i>Lantana camara</i> var. <i>aculeata</i> Moldenke	<i>Ficus microcarpa</i> Linn. f.
<i>Citharexylum spinosum</i> Linn.	<i>Eivisonia chinensis</i> R. Br.
<i>Emblia officinalis</i> Gaertn.	<i>Roystonea regia</i> O. F. Cook
<i>Feronia limonia</i> Swingle	<i>Pandanus fascicularis</i> Lamk.
<i>Ochna squarrosa</i> Linn.	<i>Eucalyptus citriodora</i> Hook.
<i>Melia azedarach</i> Linn.	<i>E. globulus</i> Labill.
<i>Chukrasia tabularis</i> A. Juss.	<i>E. paniculata</i> Sm.
<i>Schleichera oleosa</i> Oken	<i>Lagerstroemia speciosa</i> Pers.
<i>Millettia ovalifolia</i> Kurz	<i>Alstonia scholaris</i> R. Br.
<i>Pongamia pinnata</i> Pierre	<i>Polyalthia longifolia</i> Thw.
<i>Moringa oleifera</i> Lamk.	<i>Salmalia malabarica</i> Schott & Endl.
<i>Bauhinia variegata</i> Linn.	<i>Pterygota alata</i> R. Br.
<i>B. purpurea</i> Linn.	<i>Sterculia trichosiphon</i> Benth.
<i>Haematoxylon campechianum</i> Linn.	<i>Pterospermum acerifolium</i> Willd.
<i>Cassia nodosa</i> Buch.-Ham.	<i>Cestrum nocturnum</i> Linn.
<i>C. javanica</i> Linn.	<i>C. parqui</i> L'Hérit.
<i>C. renigera</i> Wall.	<i>Jacaranda mimosifolia</i> D. Don
<i>C. siamea</i> Lamk.	<i>Millingtonia hortensis</i> Linn. f.
<i>C. fistula</i> Linn.	<i>Jasminum multiflorum</i> Andr.
<i>C. artemisioides</i> Gaud.	<i>Grevillea robusta</i> A. Cunn.
<i>Delonix regia</i> Raf.	<i>Bougainvillea spectabilis</i> Willd.
<i>Acacia auriculiformis</i> A. Cunn.	<i>Casuarina equisetifolia</i> Linn.
<i>Syzygium cumini</i> Skeels	<i>Cycas revoluta</i> Thunb.
	<i>Pinus roxburghii</i> Sarg.

1. HEDGES : A number of large shrubs and small trees have been planted as hedges around gardens, parks, ancient buildings, etc. for purely ornamental effect, as screens for privacy or to hide unsightly objects or buildings, as shelter for livestock or as barriers to exclude trespassers and wild or domestic animals from fields and crops. There are many qualities that are desirable in plants used for hedging purposes.

They should be of dense, bushy, even growth and preferably armed if required for fences; the common ones are:

- | | |
|--|--|
| <i>Duranta repens</i> Linn. | <i>Tecoma stans</i> H. B. & K. |
| <i>Lantana camara</i> var. | <i>Erythrina variegata</i> var. |
| <i>aculeata</i> Moldenke | <i>orientalis</i> Merr. |
| <i>Holmskioldia sanguinea</i> Retz. | <i>Sesbania sesban</i> Merr. |
| <i>Caryopteris wallichiana</i> Schau. | <i>Poinciana pulcherrima</i> Linn. |
| <i>Vitex agnus-castus</i> Linn. | <i>Acacia modesta</i> Willd. |
| <i>V. negundo</i> Linn. | <i>A. farnesiana</i> Willd. |
| <i>Nyctanthes arbor-tristis</i> Linn. | <i>Mimosa rubicaulis</i> Lamk. |
| <i>Gmelina philippensis</i> Cham. | <i>Prosopis juliflora</i> DC. |
| <i>Dodonaea viscosa</i> Jacq. | <i>Leucaena leucocephala</i> Wit. |
| <i>Lagerstroemia indica</i> Linn. | <i>Pithecellobium dulce</i> Benth. |
| <i>Punica granatum</i> Linn. | <i>Ipomoea carnea</i> Jacq. |
| <i>Thevetia peruviana</i> Merr. | <i>Hamelia patens</i> Jacq. |
| <i>Nerium indicum</i> Mill. | <i>Viguiera helianthoides</i> H. B. & K. |
| <i>Tabernaemontana divaricata</i> R. Br. | <i>Murraya paniculata</i> Jack. |
| <i>Buddleja asiatica</i> Lour. | <i>Alpinia speciosa</i> K. Schum. |
| <i>B. lindleyana</i> Fort. | <i>Kirganelia reticulata</i> Baill. |
| <i>B. madagascariensis</i> Lamk. | <i>Euphorbia pulcherrima</i> Willd. |
| <i>Malvaviscus conzattii</i> Greenm. | <i>Jatropha gossypifolia</i> Linn. |
| <i>Hibiscus tiliaceus</i> Linn. | <i>Acalypha wilkesiana</i> Muell.-Arg. |
| <i>H. schizopetalus</i> Hook. f. | <i>Hiptage benghalensis</i> Kurz |
| <i>H. rosa-sinensis</i> Linn. | <i>Thysanolaena maxima</i> Kuntze |
| <i>Dombeya natalensis</i> Sond. | <i>Arundo donax</i> Linn. |
| | <i>D. mastersii</i> Hook. f. |

Mixed with these shrubs and trees are planted a number of undershrubs, mainly for their decorative flowers; the important ones are:

- | | |
|-------------------------------------|------------------------------------|
| <i>Jatropha panduraefolia</i> Andr. | <i>Ixora coccinea</i> Linn. |
| <i>Galphimia gracilis</i> Bart. | <i>Russelia coccinea</i> Wetts. |
| <i>Mussaenda luteola</i> Delile | <i>R. equisetiformis</i> Schlecht. |
| <i>Pentas lanceolata</i> K. Schum. | & Cham. |
| <i>Thysacanthus strictus</i> Nees | <i>Eranthemum nervosum</i> R. Br. |
| <i>Jacobinia tinctoria</i> Hemsl. | <i>Barleria cristata</i> Linn. |
| <i>Justicia gendarussa</i> Burm. f. | <i>Spiraea cantoniensis</i> Lour. |

2. CLIMBERS AND CREEPERS: Plants of this group are grown in private and public gardens as screens or along walls and pergolas or as twiners around pillars, etc. Many of them are indigenous; others have been introduced from various tropical countries. Very few of these exotic species set fruits, probably due to the fact that the pollinating agent is absent in this country. The commoner climbers and creepers are:

<i>Ipomoea quamoclit</i> Linn.	<i>Clerodendrum splendens</i> G. Don
<i>I. violacea</i> Linn.	<i>Quisqualis indica</i> Linn.
<i>I. purpurea</i> Roth	<i>Beaumontia grandiflora</i> Wall.
<i>I. catrica</i> Sweet	<i>Vallaris solanacea</i> Kuntze
<i>I. nil</i> Roth	<i>Trachelospermum jasminoides</i> Lem.
<i>I. angulata</i> Lamk.	<i>Antigonon leptopus</i> Hook. & Arn.
<i>Jacquemontia pentantha</i> G. Don	<i>Bougainvillea spectabilis</i> Willd.
<i>Porana paniculata</i> Roxb.	<i>Clitoria ternatea</i> Linn.
<i>Pyrostegia venusta</i> Miers	<i>Derris scandens</i> Benth.
<i>Bignonia unguis-cati</i> Linn.	<i>Jasminum officinale</i> Linn.
<i>Campsis radicans</i> Seem.	<i>Leptadenia reticulata</i> Wt. & Arn.
<i>Thunbergia grandiflora</i> Roxb.	<i>Tinorpora cordifolia</i> Miers
	<i>Petrea volubilis</i> Linn.

Recently Introduced Weeds. A study of the weed flora has revealed that certain American weeds have recently been introduced into Delhi State and are rapidly becoming naturalized along roadsides, in lawns, fields, waste localities on the Ridge and as an undergrowth in gardens. The common ones are:

<i>Nicotiana plumbaginifolia</i> Viv.	<i>Croton bonplandianum</i> Baill.
<i>Alternanthera pungens</i> H. B. & K.	<i>Solanum torvum</i> Sw.
<i>Gomphrena celosioides</i> Mart.	<i>Opuntia dillenii</i> Haw.
<i>Chenopodium ambrosioides</i> Linn.	<i>Oxalis latifolia</i> H. B. & K.
<i>Euphorbia geniculata</i> Orteg.	<i>O. martiana</i> Zucc.
<i>E. prostrata</i> Ait.	<i>Erigeron bonariensis</i> Linn.
<i>Jatropha gossypifolia</i> Linn.	<i>Eichhornia crassipes</i> Solmes

Some of these American weeds have well established in Delhi State. The conditions are so favourable that these are more vigorous in their new home than in the native lands. Merrill (1946) believes that at least in some cases this is because in their introduction they were unaccompanied by specific plant diseases and insect pests which checked their spread in the original homes.

STATISTICAL SYNOPSIS OF THE INDIGENOUS FLORA

Except for *Cyperaceae* and *Gramineae*, the Monocotyledones are very poorly represented. Of the 143 species of Monocotyledones (Table 1), 18 species belong to the two families mentioned above, while the remaining 25 species belong to 14 different families. The ratio of species belonging to Monocots and Dicots is 1 : 2.7; of genera 1 : 3.2 and of families 1 : 4.7. It is interesting to note the proportion of genera to species. In the whole of India it is 1 : 7, in the Gangetic

Table 1—Statistical Synopsis of the Flora

	Dicots		Monocots		Total
	%	No.	%	No.	
Families	82.61	76	17.39	16	92
Genera	76.07	248	23.93	78	326
Species	73.07	388	26.93	143	531

Table 2—Ten Dominant Families in Delhi State, Gangetic Plain Region, Rajputana and India

Delhi State	Gangetic Plain Region (Hooker, 1907)	Rajputana (Blatter & Hallberg, 1920)	India (Hooker, 1907)
Gramineae	Gramineae	Gramineae	Orchidaceae
Leguminosae	Leguminosae	Leguminosae	Leguminosae
Compositae	Cyperaceae	Compositae	Gramineae
Cyperaceae	Compositae	Cyperaceae	Rubiaceae
Acanthaceae	Scrophulariaceae	Convolvulaceae	Euphorbiaceae
Euphorbiaceae	Malvaceae	Amaranthaceae	Acanthaceae
Convolvulaceae	Acanthaceae	Botaginaceae	Compositae
Malvaceae	Euphorbiaceae	Cucurbitaceae	Cyperaceae
Amaranthaceae	Convolvulaceae	Euphorbiaceae	Labiatae
Scrophulariaceae	Labiatae	Malvaceae	Urticaceae

Table 3—Areas of Origin of the Plants of Delhi State

Region	Number of spp.	Percentage
N. African-Indian Desert Belt	22	4.60
Tropical Africa	37	7.74
Tropical Africa and N. African-Indian Desert Belt	23	4.81
Africa or West Asia	17	3.56
Mediterranean Region	10	2.09
Indian Region	81	16.95
Indo-Malayan Region and East Asia	33	6.90
Indo-Malaya and Africa	33	6.90
Temperate Region	8	1.67
New World	14	2.93
Tropical or cosmopolitan	200	41.84

Plain Region it is 1:2.2, whilst in Delhi State it is 1:1.63. This shows the small proportion of species to the number of genera and families in this area. It further conforms to the general rule that, within the same floral region, the smaller the flora, the smaller the species-genus ratio.

In order to get an insight into the relations of the Flora of Delhi State with the neighbouring places, a comparative list of the ten dominant families in Delhi State, Gangetic Plain Region, Rajputana and India as a whole is given in order of their frequency (Table 2).

Delhi is situated at the common border of Rajputana, Punjab Plains and the drier parts of Uttar Pradesh. As one would expect, the flora of Delhi, characterized by the plants on the 'Ridge' shows common features with the flora of these adjoining tracts. Table 2 shows that the families *Gramineae*, *Leguminosae*, *Compositae* and *Cyperaceae* occupy first four positions in the Flora of Delhi State, Gangetic Plain Region and Rajputana. Among the different types of vegetation found in India, the 'dry tropical scrub forests' are situated in Rajputana and the Punjab Plains where rainfall does not exceed 100 cm. The most characteristic trees are: *Prosopis spicigera* Linn. and various species of *Capparis*, *Salvadora* and *Tamarix*. The indigenous vegetation of the upper part of the Gangetic Plain is a 'dry forest'. The principal forest in this region is characterized by *Anogeissus pendula* Edgew., *Acacia senegal* Willd., *Prosopis spicigera* Linn., *Boswellia serrata* Roxb., *Balsamodendron mukul* Hook., *Moringa* sp. and *Rhus* sp. *Salvadora* spp. are characteristic of the so-called 'Usar or Reh-lands' which are impregnated with alkalies and occupy a considerable area of this region (Hooker, 1907). The extensive tracts of low and scattered bush jungle, known locally as 'Rakhs' and found in some parts of Punjab plains, consist chiefly of *Prosopis spicigera* Linn., *Salvadora oleoides* Decne., *Capparis decidua* Edgew., *Acacia arabica* Willd., *A. leucophloea* Willd., *Zizyphus nummularia* Wt. & Arn., and *Cocculus pendulus* Diels.

Among the types mentioned above, the Ridge vegetation is represented by *Prosopis spicigera* Linn., *Salvadora persica* Linn., *S. oleoides* Decne., *Capparis decidua* Edgew., *C. sepiaria* Linn., *Acacia leucophloea* Willd., *A. senegal* Willd., *A. arabica* Willd., *A. modesta* Wall., *Anogeissus pendula* Edgew., *Balanites roxburghii* Planch., *Butea monosperma* Taub., *Carissa spinarum* Linn., *Zizyphus nummularia* Wt. & Arn. and scattered individuals of *Rhus mysurensis* Heyne, etc. The occurrence of a mixture of these characteristic plants shows that the Ridge vegetation is composed of the floral elements of three abutting regions—Rajputana, the Punjab Plains and the drier parts of Uttar Pradesh.

NOTES ON THE FLORA

Out of 531 indigenous and naturalized species, 478 species have

been dealt with; the rest have not been considered on account of their rarity, incomplete names and abnormal distribution. Table 3 shows the areas of origin of the plants comprising the flora of the State.

It would appear from Table 3 that 41.84% of the total number of species are either of tropical distribution or cosmopolitan. These figures reveal that as the area was denuded of its original plant cover, there developed conditions for what may be called a 'cosmopolitan type of flora', taking the place formerly occupied by the displaced species. The introduction of foreign plants had a somewhat deleterious influence on the native vegetation and as settlement advanced, the flora began to assume a mixed character. These alien plants are mostly plain-dwellers and are better accustomed to the heat of the sun in the summer and the cold blasts of winter than the indigenous ones.

Blatter and Hallberg (1920) distinguished three well marked elements in the flora of the Rajputana Desert: a western, an eastern and a more general element (including Indian element). Similar elements have been noted in the flora of this area: one coming from the Malayan Region in the east, another from North Africa through Asia Minor and a third widespread element of the tropics and of purely Indian species. There are no endemic plants in Delhi State. Leaving aside the general element, the phytogeographical status of the flora shows that the western element consists of 109 species and the eastern element of 33 species. The eastern element in the area is about 1/3 of the western whilst it is 1/7 in the flora of Rajputana Desert. Thus, the Indo-Malayan element is much less represented in Western Rajputana. Drude (quoted in Blatter and Hallberg, 1920) drew the line of demarcation between the Indo-Malayan flora and that of the Perso-Arabian Region from the Gulf of Cambay northwards along the Aravallis. This seems to be correct.

Nomenclature. The scientific names of the plants listed in the present work have been corrected as far as possible, but for those cases that come under the provisions of Article 43 of the present International Code of Botanical Nomenclature (1961), it is too difficult for the botanists in India to find out the actual or correct authors of the various names. For the genera *Desmodium* and *Alysicarpus*, Schindler has shown that many of the plants under these two genera in India are wrongly attributed to De Candolle, they being wrongly identified. Until the monographs on these genera are published, the usual nomenclature found in authentic works on Indian botany has been followed. When a name other than the usual one has been adopted, the *basionym* on which the newer name is based, has also been given, showing the date of the latter, so that the names adopted are in conformity with the Rule of Priority. As a result many of the names given by J. D. Hooker, Duthie and Parker in their floras have been relegated to the synonymy and some new combinations have been adopted.

Citations and References to Plates. Only such citations are given which have been studied and verified by the author. Hooker f.'s FBI., Duthie's FUGP. and Parker's For. Fl. have been cited throughout. For ornamental climbers and shrubs, the works cited are: Bailey's *Manual of Cultivated Plants*; Bor and Raizada's 'Some Beautiful Indian Climbers and Shrubs' and Blatter and Millard's 'Some Beautiful Indian Trees'.

Keys, Order of Families, Local Names, Measurements, etc. The keys provided in the present work are based largely on macroscopic characters and are of two types: natural and artificial. They have been divided into three main parts: (1) a general key to the leading families, (2) key to the genera of each family, and (3) key to the species in different genera. In species-keys, an attempt has been made as far as possible to make them dichotomous. In artificial keys the various genera of equal rank are marked by the same number. All keys have been kept as simple as possible and in doubtful cases the genus is included in more than one group.

For the sake of convenience, Benlham and Hooker's order of families has been followed; the same arrangement having been recognized in Hooker's *Flora of British India* and Duthie's *Flora of the Upper Gangetic Plain*. As regards splitting of families, I have adopted, in general, Hutchinson's classification, published in his book 'The families of flowering plants' (1926, 1934).

In describing the various parts of a grass floret, Blatter and McCann's (1935) terminology has been used for the two classes of glumes, involucre and floral.

Only such vernacular names are given which I have ascertained to be in use locally. These names vary greatly from place to place and often the same name is used to indicate different plants, or very different plants have the same native names. In general, it has been noticed that only such plants which are economically useful have local names; small herbs which are not used either medicinally or as an article of food have no names. The uses of plants have also been recorded.

Throughout this work the decimal and metric systems are used. The measurements of plant parts, e.g. leaves 4.7×3.5 cm. means leaves 4.7 cm. long and 3.5 cm. wide.

The herbarium specimens cited in this work are housed in the Department of Botany, University of Delhi, Delhi.

Classification

Embryo with 2 cotyledons (rarely one by reduction). Vascular bundles of the stem usually arranged in a single ring, cambium usually present. Leaves usually reticulately veined. Flowers typically 5 to 4-merous Class I DICOTYLEDONES

Embryo with one cotyledon. Vascular bundles of the stem usually scattered, cambium usually absent. Leaves usually parallel-veined. Flowers typically 3-merous Class II MONOCOTYLEDONES

CLASS I DICOTYLEDONES

- Petals free ; flowers dichlamydeous Subclass I Polypetalae
- Calyx of distinct sepals ; ovary superior or immersed in the disk :
 - Torus small or elongated, not expanded Group I Thalamiflorae
 - Torus thickened or expanded into a fleshy disk Group II Disciflorae
- Calyx of united sepals ; ovary usually included in calyx tube or inferior Group III Calyciflorae
- Petals united Subclass II Gamopetalae
- Perianth generally calycine, single or absent Subclass III Monochlamydeae

Subclass I Polypetalae

Group I Thalamiflorae

1. Stamens numerous (15 or more) :
2. Gynoecium apocarpous ; carpels usually many, but sometimes reduced to one :
3. Habit terrestrial :
 4. Plants herbaceous 1. Ranunculaceae
 4. Plants woody :
 5. Stipules convolute ; sepals and petals imbricate ; fruit dry 2. Magnoliaceae
 5. Stipules absent ; sepals and petals valvate ; fruit fleshy 3. Annonaceae

3. Habit aquatic 5. Nymphaeaceae
2. Gynoecium syncarpous ; ovary uni- to multilocular :
6. Placentation parietal, sometimes spuriously 2- or more celled by prolongation of the placentas :
7. Gynoecium elevated on a stipe (gynophore) 9. Capparidaceae
7. Gynoecium not elevated :
8. Sepals 2 ; fruit a capsule opening by pores 6. Papaveraceae
8. Sepals 4-5 ; fruit indehiscent ; flowers usually dioecious 12. Flacourtiaceae
6. Placentation free-central or basal-central ; leaves fleshy ; herbs 15. Portulacaceae
6. Placentation usually axile, sometimes basal :
9. Stamens monadelphous :
10. Anthers unilocular :
11. Carpels 5 to many, often splitting away from the central axis or becoming free in fruit ; pollen rough ; mostly herbs or shrubs 18. Malvaceae
11. Carpels 2-5, not or very rarely splitting away from the central axis in fruit ; pollen smooth ; tropical trees 19. Bombacaceae
10. Anthers bilocular 20. Sterculiaceae
9. Stamens distinct ; anthers bilocular 21. Tiliaceae
1. Stamens few, never more than 10 :
12. Gynoecium apocarpous ; climbing shrubs 4. Menispermaceae
12. Gynoecium syncarpous ; herbs, shrubs or trees :
13. Sepals 5, the two inner enlarged and often petaloid 13. Polygalaceae
13. Sepals 2-5, not enlarged :
14. Leaves scale-like ; seeds winged 16. Tamaricaceae
14. Leaves well developed :
15. Placentation parietal :
16. Ovary open at top before seeds are ripe 10. Rcsedaceae
16. Ovary closed at top :
17. Connective of the anthers produced above the cells ; flowers zygomorphic, the lower petal often gibbous or saccate at the base. 11. Violaceae
17. Connective of the anthers not produced ; flowers actino- or zygomorphic :
18. Stamens 6, tetradynamous ; sepals 4 8. Cruciferae

- 18. Stamens not tetradynamous, but 4 or 6, opposite the petals and more or less united into 2 bundles; sepals 2 . . . 7. Fumariaceae
- 15. Placentation free-central;
 - 19. Sepals 2; petals 4-5; leaves fleshy . . . 15. Portulacaceae
 - 19. Sepals and petals 5 each; leaves not fleshy . . . 14. Caryophyllaceae
- 15. Placentation axile;
 - 20. Stamens monadelphous . . . 20. Sterculiaceae
 - 20. Stamens not monadelphous, but separate:
 - 21. Leaves alternate, rarely opposite; sepals valvate . . . 21. Tiliaceae
 - 21. Leaves opposite; sepals imbricate . . . 17. Elatinaceae

Group II Disciflorae

- 1. Placentas parietal; fruit a 3-valved, elongated, pod-like capsule . . . 36. Moringaceae
- 1. Placentas axile or axile-pendulous; fruit not elongated:
 - 2. Styles 1-5, quite free; filaments often connate at the base:
 - 3. Leaves compound; juice sour . . . 25. Oxalidaceae
 - 3. Leaves simple; sap not sour:
 - 4. Leaves alternate; fruit not winged . . . 22. Linaceae
 - 4. Leaves opposite; fruit winged . . . 23. Malpighiaceae
 - 2. Styles more or less connate or solitary; stamens generally free:
 - 5. Herbage covered with glandular dots . . . 26. Rutaceae
 - 5. Herbage not covered with glandular dots:
 - 6. Stamens monadelphous . . . 30. Meliaceae
 - 6. Stamens free, distinct:
 - 7. Ovules usually 1 in each cell:
 - 8. Stems bearing resin passages . . . 35. Anacardiaceae
 - 8. Resin passages not usually present:
 - 9. Leaves compound:
 - 10. Flowers regular; styles 2-5 . . . 27. Simaroubaceae
 - 10. Flowers irregular; style simple, sometimes divided above . . . 34. Sapindaceae
 - 9. Leaves simple:
 - 11. Lateral nerves usually parallel . . . 28. Ochnaceae
 - 11. Lateral nerves not conspicuously parallel:
 - 12. Plants usually armed with prickles; fruit dry or a drupe, not winged . . .

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- 12. Plants unarmed ; fruit winged 32. Rhamnaceae
- 13. Plants resinous ; leaves dotted 29. Burseraceae
- 13. Plants not resinous ; leaves not dotted :
 - 14. Plants usually cirrhose ; fruit baccate 33. Vitaceae
 - 14. Plants usually not tendril-bearing ; fruit dry, capsular, indehiscent or splitting at maturity :
 - 15. Leaves simple :
 - 16. Stamens 3-5 ; style short or 0 31. Celastraceae
 - 16. Stamens often 8 ; styles 2-4, simple or divided 34. Sapindaceae
 - 15. Leaves compound or multifid :
 - 17. Herbs or undershrubs ; leaves stipulate or stipules modified into thorns 24. Zygophyllaceae
 - 17. Trees or shrubs ; leaves exstipulate 34. Sapindaceae

Group III Calyciflorae

- 1. Fruit a legume :
 - 2. Flowers papilionaceous ; odd petal adaxial 37. Papilionaceae
 - 2. Flowers zygomorphic but not papilionaceous ; odd petal not adaxial 38. Caesalpinaceae
- 2. Flowers regular, in heads or dense spikes 39. Mimosaceae
- 1. Fruit a capsule, achene, drupe, berry, pepo, nut or schizocarp :
 - 3. Stamens usually indefinite :
 - 4. Leaves usually much reduced or 0 ; succulent plants with jointed phylloclades, prickly 49. Cactaceae
 - 4. Leaves well developed :
 - 5. Calyx free from the ovary :
 - 6. Carpels distinct or solitary ; leaves stipulate ; petals usually present 40. Rosaceae
 - 6. Carpels more or less combined ; leaves exstipulate :
 - 7. Petals present (sometimes absent), episepalous and crumpled in bud ; leaves not fleshy ; ovary 2 to 6-celled, ovules usually on axile placentas ; herbs, shrubs or trees 43. Lythraceae
 - 7. Petals absent ; leaves often fleshy ; ovary 1 to 2-celled, ovules basal ; herbs 51. Aizoaceae

5. Calyx more or less adnate to the ovary ; 44. Punicaceae
8. Locules of ovary superposed 40. Rosaceae
8. Locules of ovary not superposed : 42. Myrtaceae
9. Ovary of 1 or more, free or connate carpels ; leaves not glandular
9. Ovary syncarpous, usually 2 to many-celled ; leaves glandular-punctate
3. Stamens definite, not more than 10 ;
10. Ovary half-inferior or inferior :
11. Aquatic herbs 46. Trapaceae
11. Terrestrial :
12. Flowers in simple or compound umbels ; foliage aromatic ; petioles sheathing 52. Umbelliferae
12. Flowers solitary, axillary or in racemes, spikes or cymes ; foliage not aromatic :
13. Stems tendril-bearing ; flowers unisexual ; habit chiefly climbing or prostrate 48. Cucurbitaceae
13. Stems without tendrils ; flowers generally hermaphrodite ; habit erect, prostrate or climbing :
14. Calyx or calyx tube free from the ovary :
15. Petals present (sometimes absent), episepalous and crumpled in bud ; leaves not fleshy ; seeds non-endospermic 43. Lythraceae
15. Petals absent ; leaves often fleshy ; seeds endospermic 51. Aizoaceae
14. Calyx or calyx tube adnate to the ovary :
16. Trees, shrubs or climbers ; fruit often winged 41. Combretaceae
16. Herbs or undershrubs ; fruit not winged 45. Onagraceae
10. Ovary superior :
17. Small trees or shrubs, with milky juice ; petals united into a slender tube ; fruit a large, pulpy berry 47. Caricaceae
17. Herbs, without milky juice ; petals not united into a tube ; fruit dry 50. Molluginaceae

Subclass II Gamopetalae

1. Ovary inferior or adnate to the calyx :
2. Ovary usually with more than 1 cell ; anthers not united :
3. Leaves opposite ; inflorescence various ; terrestrials :
4. Leaves usually exstipulate, if stipulate, then usually compound 53. Caprifoliaceae

4. Leaves stipulate or apparently whorled and without stipules, always simple 54. Rubiaceae
3. Leaves alternate ; flowers in dense spikes ; amphibious herbs 56. Sphenocleaceae
2. Ovary 1-celled ; anthers united 55. Compositae
1. Ovary superior or free :
5. Leafless, non-green, root or stem parasites and leafy, carnivorous plants :
6. Parasites ; terrestrial : 71. Cuscutaceae
7. Stem parasites 74. Orobanchaceae
7. Root parasites 75. Lentibulariaceae
6. Carnivorous aquatics
5. Green plants, not carnivorous and seldom parasitic :
8. Leaves radical ; inflorescence scapose, capitate or spicate 82. Plantaginaceae
8. Leaves generally alternate :
9. Flowers usually unisexual ; stamens inserted on the receptacle 60. Ebenaceae
9. Flowers bisexual ; stamens inserted on the corolla :
10. Ovules indefinite in each cell :
11. Style usually deeply 2-cleft 67. Hydrophyllaceae
11. Style linear or not deeply 2-cleft 72. Solanaceae
10. Ovules definite in each cell :
12. Styles 5 ; stamens opposite the petals ; placentation free-central 57. Plumbaginaceae
12. Style simple or once or twice forked ; placentation not free-central :
13. Trees and shrubs :
14. Plants with milky juice ; corolla 4 to 8-lobed ; fruit a berry 59. Sapotaceae
14. Plants without milky juice ; corolla usually 5-lobed ; fruit a drupe or of 4 nutlets 69. Ehretiaceae
13. Herbs or undershrubs :
15. Habit chiefly climbing or twining ; style terminal ; fruit a capsule 70. Convolvulaceae
15. Habit erect, diffuse or prostrate ; style usually gynobasic ; fruit of four, 1-seeded nutlets or a drupe 68. Boraginaceae
8. Leaves at least the lower ones opposite (alternate in *Jasminum humile*) :
16. Flowers regular ; ovary generally of 2 carpels, sometimes 1 or 3 :
17. Plants with milky latex :

CLASSIFICATION

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- 18. Filaments free ; pollen not agglutinated in wax-like masses ; style 1 63. Apocynaceae
- 18. Filaments united into a tube ; pollen agglutinated in wax-like masses or pollinia ; styles 2 64. Asclepiadaceae
- 17. Plants without milky latex 61. Oleaceae
- 19. Stamens 2 62. Salvadoraceae
- 19. Stamens 4 or 5 ; 65. Loganiaceae
- 20. Trees or shrubs ;
- 21. Ovary usually 1-celled, ovules 1-2 in each cell
- 21. Ovary usually 2-celled, ovules usually many in each cell
- 20. Herbs ;
- 22. Stamens opposite the petals ; placentation free-central 58. Primulaceae
- 22. Stamens alternate with the petals ; placentation parietal 66. Gentianaceae
- 16. Flowers irregular ; ovary of 2-4 carpels ; 76. Bignoniaceae
- 23. Fruit elongated ; seeds winged
- 23. Fruit not elongated ; seeds not winged ;
- 24. Bracts conspicuous ; stems with swollen joints 79. Acanthaceae
- 24. Bracts minute or absent ; joints of stem not swollen ;
- 25. Flowers with extra-floral glands (metamorphosed flowers) at the base of the pedicels ; fruit commonly spiny or with hooked prongs ; 77. Pedaliaceae
- 26. Placentas axile 78. Martyniaceae
- 26. Placentas parietal
- 25. Flowers eglandular at the base ; fruit not commonly spiny ;
- 27. Ovule 1 or 2 in each cell ;
- 28. Ovary entire ; style terminal 80. Verbenaceae
- 28. Ovary 4-lobed ; style gynobasic 81. Labiatae
- 27. Ovules many in each cell 73. Scrophulariaceae

Subclass III Monochlamydeae

- 1. Flowers all bisexual ;
- 2. Ovary superior :
- 3. Leaves with ocreate stipules 87. Polygonaceae

- 3. Leaves exstipulate : 89. Proteaceae
- 4. Trees
- 4. Herbs or shrubs :
 - 5. Perianth bract-like :
 - 6. Flowers bracted, the bracts and sepals mostly scarious 84. Amaranthaceae
 - 6. Flowers bractless, or if bracted, the bracts not scarious ; sepals green 85. Chenopodiaceae
 - 5. Perianth not bract-like :
 - 7. Herbs or shrubs, sometimes straggling ; flowers in heads, cymes or umbels ; stamens circinate involute in bud 83. Nyctaginaceae
 - 7. Twiners ; flowers in spikes, racemes or panicles ; stamens not as above 86. Basellaceae
- 2. Ovary inferior :
 - 8. Non-parasitic herbs or shrubs, often climbing 88. Aristolochiaceae
 - 8. Chlorophyll-bearing, woody, semi-parasites 90. Loranthaceae
- 1. Flowers unisexual or polygamous :
 - 9. Male and (or) female flowers in catkins or spikes :
 - 10. Plants with milky juice 93. Moraceae
 - 10. Plants without milky juice :
 - 11. Leaves much-reduced, scale-like ; ovules with numerous embryo sacs ; fruit 1-seeded, crowded into a cone 95. Casuarinaceae
 - 11. Leaves well developed ; ovules with only one embryo sac ; fruit many-seeded, a capsule 96. Salicaceae
 - 9. Flowers not in catkins or spikes :
 - 12. Aquatics ; perianth absent ; carpel 1 ; leaves finely dissected 97. Ceratophyllaceae
 - 12. Terrestrials :
 - 13. Ovary 3-celled, with 1 or 2 ovules in each cell 91. Euphorbiaceae
 - 13. Ovary 1-celled :
 - 14. Leaves exstipulate 84. Amaranthaceae
 - 14. Leaves stipulate :
 - 15. Plants aromatic ; fruit an achene 94. Cannabinaceae
 - 15. Plants not aromatic ; fruit a samara, nut, drupe or multiple :
 - 16. Sap milky ; fruit commonly multiple 93. Moraceae
 - 16. Sap not milky ; fruit a samara, nut or drupe 92. Ulmaceae

CLASS II MONOCOTYLEDONES

1. Foliage of the palm-type, i.e. large, stiff, palmate or pinnate leaves ;
ovary 3-celled, 3-ovuled 110. Palmae
1. Foliage not palm-like (leaves not large, stiff, palmate or pinnate) :
2. Perianth none, at least in the male flowers (if the flowers are unisexual) or rudimentary or of bristles or scales, not petaloid :
3. Flowers in the axils of dry, chaffy, usually imbricated bracts (glumes or scales), arranged in spikelets :
4. Culms mostly solid, usually triangular in section, not noded ;
leaves not ligulate ; leaf sheaths not split ; fruit an achene 119. Cyperaceae
4. Culms mostly hollow, cylindrical or flattened, noded ; leaves
ligulate ; leaf sheaths split ; fruit a caryopsis 120. Gramineae
3. Flowers not in the axils of dry, chaffy bracts (glumes or scales) :
5. Parts of perianth represented by bristles ; plants monococious,
with staminate flowers above and pistillate flowers below, in
long terminal spikes 112. Typhaceae
5. Parts of perianth lacking, or of 4-8 scales :
6. Floating or submerged aquatics :
7. Minute, floating, thalloid aquatics ; stigma truncate
or funnel-shaped 114. Lemnaceae
7. Filiform, submerged aquatics ; stigma large, peltate,
deflexed 118. Zannichelliaceae
6. Terrestrials :
8. Woody plants ; leaves spinose on the keel and
margins ; staminate and pistillate organs separate 111. Pandanaceae
8. Tuberous herbs (sometimes woody) ; leaves spineless ;
staminate flowers at the top and pistillate flowers
beneath on the same axis 113. Araceae
2. Perianth present, usually of 2 series, at least the inner petaloid, not of
bristles or scales :
9. Pistils one to several, not united, each representing one carpel :
10. Perianth composed of calyx and corolla ; parts 6, in 2 series
115. Alismataceae
10. Perianth, if present, calyx-like or of only one whorl of parts :
11. Perianth corolla-like, of only one whorl of parts
116. Aponogetonaceae
11. Perianth none, but with sepal-like appendages on the
stamens 117. Potamogetonaceae
9. Pistil 1, of united carpels, as evidenced by placentas, stigma
lobes and style branches :
12. Ovary superior :

13. Outer segments of perianth calyx-like and different from the inner corolla-like segments 108. Commelinaceae
13. Outer and inner segments of perianth essentially alike, either all sepaloid or petaloid :
14. Aquatic herbs ; inflorescence subtended by a spathe-like leaf sheath 107. Pontederiaceae
14. Terrestrial or marshy plants ; inflorescence not subtended by a leaf sheath :
15. Grass-like herbs ; perianth sepaloid 109. Juncaceae
15. Plants not grass-like ; perianth usually petaloid :
16. Plants usually very xerophytic ; leaves mostly fibrous and thick or fleshy, in a dense tuft either at the base or apex of the stem ; flowers mostly in large panicles 103. Agavaceae
16. Plants not or only slightly xerophytic ; leaves not fibrous :
17. Leaves 3 to 5-nerved, with reticulate venation ; flowers unisexual, rarely hermaphrodite ; plants often with tendril-like petioles and prickly stems and branches 106. Smilacaceae
17. Leaves with parallel venation ; flowers hermaphrodite, rarely unisexual ; plants without tendrillar petioles and prickles 105. Liliaceae
12. Ovary and fruit partly or wholly inferior :
18. Fertile stamens 1-2, the other often becoming petaloid staminodia and more conspicuous than the perianth :
19. Stamen or stamens grown together with the pistil to form a gynandrium or column ; ovary twisted ; pollen often agglutinated in pollinia 99. Orchidaceae
19. Stamens and pistil not so grown together ; ovary not twisted 101. Zingiberaceae
18. Fertile stamens 3 or more, no petaloid staminodia :
20. Habit aquatic, submerged or floating 98. Hydrocharitaceae
20. Habit terrestrial :
21. Perianth segments in 2 series, the outer differing from the inner in size, shape or colour :
22. Petals dissimilar or only one ; plants mostly large, almost tree-like 100. Musaceae
22. Petals essentially alike, 3 in number ; plants usually not very large 102. Amaryllidaceae

21. Perianth segments not in 2 distinct series, but all
petaloid :
23. Plants herbaceous vines with small, bisexual
flowers 104. Dioscoreaceae
23. Plants not vine-like ; flowers bisexual :
24. Leaves mostly fibrous, thick and fleshy ;
flowers mostly in large panicles ; corona
never present 103. Agavaceae
24. Leaves not fibrous ; flowers umbellate at
the top of the scape ; corona often present
. 102. Amaryllidaceae

Families

CLASS I DICOTYLEDONES

1. Ranunculaceae

Ranunculus Linn.

Semi-aquatic or moisture-loving herbs with yellow flowers

Aquatic herbs with white flowers *R. sceleratus*
R. aquatilis var. *trichophyllus*

R. sceleratus Linn. Sp. Pl. 551, 1753; FBI. 1 : 19; FUGP. 1 : 19.

An erect, glabrous annual, 30-60 cm. tall. Stems succulent, branched, fistular, ribbed. Radical leaves long-petiolate; segments obovate, cuneate. Cauline leaves shortly petiolate, 3-fid or partite, with linear segments. Flowers yellow. Calyx reflexed. Achenes many, in oblong heads, obliquely obovate.

A common herb during winter and early summer days near water. Found in Okhla and along the banks of Jamuna River as well as on the temporary, muddy flats of Khadar area in sandy-clayey or silty, moist soils.

Local name : Jaldhania

Flowers and Fruits : Jan.-June

J. K. Maheshwari 592

R. aquatilis Linn. var. *trichophyllus* Hook. f. & Thoms. in FBI. 1 : 16, 1872; FUGP. 1 : 19.

R. aquatilis Linn. Sp. Pl. 556, 1753, in part; Don in Royle, III. 54.

The occurrence of this plant is given on the authority of Royle (loc. cit.) who describes it as 'occasionally in the Gangetic Plain as far south as Saharanpur and Delhi'. I have not seen the plant on the field. A short description is reproduced below.

Leaves all submerged; segments thread-like; stipules auricled. Flowers white, shortly pedicelled. Stamens few. Achenes in globular heads, transversely wrinkled.

2. Magnoliaceae

Flowers axillary; gynoecium stipitate

Michelia

Flowers terminal ; gynoecium sessile *Magnolia*

Michelia Linn.

M. champaca Linn. Sp. Pl. 536, 1753 ; Benthall, Trees Calc. 5.

An evergreen tree with oblong crown. Leaves 12-20 × 5-6 cm., ovate-lanceolate, tapering at ends, entire or wavy. Flowers yellow, scented. Fruiting spikes 7.5-15 cm. long. Carpels ovoid.

Planted in lawns and parks.

Local name : Champa

Flowers : April-May. Fruits : June-Aug.

J. K. Maheshwari 1177

Magnolia Linn.

M. grandiflora Linn. Syst. 1082, 1759 ; Benthall, Trees Calc. 3.

An evergreen, small tree with a pyramidal, dense crown. Leaves thick, firm, oblong, obovate or elliptic, glossy green above, pale beneath. Flowers white.

Occasionally planted in gardens.

Flowers : Aug.-Sept.

J. K. Maheshwari 576

3. Annonaceae

Tepals in two series or those of third series very small ; carpels subconnate ; fruit a fleshy syncarp or 'apple' formed by the fusion of pistils and receptacle *Annona*

Tepals in 3 series ; carpels free ; fruit a cluster of drupels . . . *Polyalthia*

Annona Linn.

A. squamosa Linn. Sp. Pl. 537, 1753 ; FUGP. 1 : 23 ; Benthall, Trees Calc. 12.

A shrub or small tree. Bark grey. Leaves oblong-lanceolate, 8-15 × 2-3 cm., glabrous. Flowers greenish-yellow, drooping, solitary or more, on short, leaf-apposed peduncles. Fruit a fleshy syncarp, globular, cordate-ovoid or conical, yellowish-green ; pulp sweet. Seeds large, black.

Occasionally cultivated in gardens for its delicious fruits.

Local name : Sharipha

Flowers : May-June

J. K. Maheshwari 1418

Polyalthia Bl.

P. longifolia Thw. Enum. 198, 1864 : FBI. 1 : 62 ; Benthall, Trees Calc. 9.
A medium-sized, handsome, evergreen, glabrous tree with a close
symmetrical head and straight trunk. Leaves up to 30 × 5 cm., lanceolate,
long-acuminate ; margins undulate. Flowers yellowish-green, numerous,
in umbellate, pendent cymes. Fruits ovoid.

The tree has been planted in avenues and in public or private gardens.
It remains stunted under unfavourable, dry conditions.

Local name : Ashok
Flowers and Fruits : May-June
J. K. Maheshwari 1175

4. Menispermaceae

| | |
|--|--------------------|
| Carpels solitary | <i>Cissampelos</i> |
| Carpels 3 or more | |
| Leaves ovate-oblong, villous, dark green | <i>Cocculus</i> |
| Leaves ovate or ovate-cordate, glabrous, green | |
| Ovaries 3 or fewer by abortion | <i>Tinospora</i> |
| Ovaries 3-12 | <i>Tiliacora</i> |

Cissampelos Linn.

C. pareira Linn. Sp. Pl. 1031, 1753 ; FBI. 1 : 103 ; FUGP. 1 : 30 ;
Parker, For. Fl. II.

A twining, perennial shrub, putting forth annually long, twining, wiry
branches. Leaves 4-10 × 4-10 cm., triangularly broad cordate, hemispheri-
cal or suborbicular, usually peltate ; mature ones glabrous above, glau-
cous beneath. Flowers pale green, minute. Male flowers in axillary,
branched cymes, densely tomentose. Female flowers 1-2, in the axils
of conspicuous bracts. Drupes 4 × 5 mm., subglobose, red when ripe.

Common in fruit orchards and hedges of parks and gardens on moist
soil, either creeping on the ground or twining around trees and shrubs.
The roots are sold in the market as a drug. The leaves are said to be used
for sores and itches.

Local name : Patat ki bel ; Nirbsi ; Jaljamini
Flowers and Fruits : Sept.-Oct.
J. K. Maheshwari 452

Cocculus DC. nom. cons.

C. hirsutus (Linn.) Diels in Pfreich. 46 : 236, 1910 ; Santapau in RBSI,
16(1) : 5, 1953.

Menispermum hirsutum Linn. Sp. Pl. 341, 1753.

Cocculus villosus DC. Syst. 1 : 525, 1818 ; FBI. 1 : 101 ; FUGP. 1 : 28.

A climbing shrub. Leaves ovate or ovate-oblong, 5-8 × 3-5.5 cm., dark green above, usually subauriculate at the base. Male flowers in short, axillary panicles. Female flowers 1-3 ; bracts small. Drupes dark purple.

Common in the area on hedges and trees. On the Ridge it is found climbing upon *Capparis sepiaria* Linn., *Grewia tenax* Fiori, and other shrubs. Said to be a fodder plant and used as cooling medicine in eye troubles.

Local name : Khareta ki bel ; Chiretta

Flowers and Fruits : Feb.-March

J. K. Maheshwari 616 ; 809 ; 1322 ; 1323

Finospora Miers

T. cordifolia (Willd.) Miers in Ann. & Mag. nat. Hist. ser. 2, 7 : 38, 1851 ; FBI. 1 : 97 ; FUGP. 1 : 26.

Menispermum cordifolium Willd. Sp. Pl. 4 : 826, 1806.

A glabrous, climbing shrub. Leaves cordate, petiolate. Flowers small, yellow ; male ones in fascicles, females usually solitary.

Grown for its decorative foliage in gardens and along the streets of Delhi, as a climber on trees or along the walls.

Local name : Gulel

J. K. Maheshwari 100

Tiliacora Colebr.

T. acuminata (Lamk.) Miers in Ann. & Mag. nat. Hist. ser. 2, 7 : 39, 1851 ; Diels in Pfreich. 46 : 61.

Menispermum acuminatum Lamk. Encycl. 4 : 101, 1797.

Tiliacora racemosa Colebr. in TLS. 13 : 67, 1822 ; FBI. 1 : 99 ; FUGP. 1 : 27.

An evergreen, climbing shrub. Leaves ovate or ovate-cordate, 10-15 × 7-10 cm., dark green ; margins undulate. Flowers yellow, dioecious, in axillary panicles.

Occasionally grown in gardens for its ornamental foliage and fragrant flowers.

Flowers : Sept.-Oct.

J. K. Maheshwari 1311

5. Nymphaeaceae

Leaves floating ; ovary composed of many cells *Nymphaea*
Leaves raised above the water ; carpels distinct, sunk in fleshy torus

. *Nelumbo*

Nymphaea Linn. nom. cons.

Leaves entire or wavy; anthers with long appendages . . . *N. stellata*
Leaves sharply toothed; anthers without appendages . . . *N. nouchali*

N. stellata Willd. Sp. Pl. 2 : 1153, 1799; FBI. 1 : 114; FUGP. 1 : 34.
A floating herb. Leaves orbicular or elliptic, cleft at base, blotched with purple beneath. Flowers white, blue, rose or purple, mildly scented.

Fruits globular.
Cultivated in ponds.

Local name : Chota kamal
Flowers and Fruits : Sept.-Oct.
J. K. Maheshwari 243

N. nouchali Burm. f. Fl. Ind. 120, 1768; Merr. in Philip. Jour. Sci. (Bot.) 19 : 350, 1921 & Enum. 2 : 140, 1923.

N. pubescens Willd. Sp. Pl. 2 : 1154, 1799.
N. lotus Hook. f. & Thoms. in FBI. 1 : 114, 1872 (non Linn.).

A floating, aquatic herb. Leaves sagittate when young, sharply toothed, pubescent beneath. Flowers variable in size and colour, opening in the morning, closing shortly before noon. Anthers without appendages. Berries globose, ripening under water; stigmatic rays with appendages. Seeds broadly ellipsoid.

Common after the rains in Najafgarh Drain, Hindan River and in the temporary water marshes of Shahdara. The rhizome is eaten either raw or cooked. The flowers are sold in the market and from which several preparations known locally as Ghillad, Gulkand, etc. are made. Planted as an aquatic ornamental in gardens.

Duthie in FUGP. (1 : 33, 1903) records the occurrence of *N. lotus* Linn. from the Upper Gangetic Plain. According to Conard (Rhodora 18 : 161-164, 1916) this is not an Indian species. He distinguished two different species on the flower colour—*N. rubra* Roxb. and *N. pubescens* Willd. I have followed Santapau (RBSI. 16 : 7, 1953) in combining *N. rubra* Roxb. with *N. pubescens* Willd., since there is a wide range of flower colours.

Local name : Salak ki patuki; Kamal-kakri; Neelophal
Flowers and Fruits : Sept.-Oct.
J. K. Maheshwari 435

Nelumbo Adans.

N. nucifera Gaertn. Fruct. 1 : 73, t. 19, f. 2, 1788; Santapau in RBSI. 16(1) : 7, 1953.

Nymphaea nelumbo Linn. Sp. Pl. 511, 1753.

Nelumbium speciosum Willd. Sp. Pl. 2 : 1258, 1799; FBI. 1 : 116; FUGP. 1 : 35.

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A large, handsome, aquatic herb with milky juice and long, creeping under water rootstock. Leaves 60-90 x 60-90 cm., about a metre high above water, orbicular, centrally peltate. Flowers white or rose-coloured, 10-15 cm. across, fragrant, solitary. Anthers yellow in white-flowered, and orange in rose-coloured forms. Carpels sunk in a torus, oblong. Seeds with spongy seed coats.

Commonly planted during the rainy season in the Hindan River. The rhizomes, leaves, stalks, flowers and seeds are sold in the market. The leaves are used as food plates. The plant is held in high regard by the Hindus.

Local name : Kamal

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 1156

6. Papaveraceae

Plants prickly ; sap yellow

Plants glaucous or hispid, but not prickly ; sap milky

Argemone

Papaver

Argemone Linn.

Flowers yellow

Flowers white

A. mexicana

A. ochroleuca

A. mexicana Linn. Sp. Pl. 508, 1753 ; FBI. 1 : 117 ; Stewart, Punj. Pl. 9 ;

Prain in Jour. Bot. 33 : 308, 1895 ; FUGP. 1 : 36.

A robust herb to bushy undershrub, branching from below. Stems and branches woody. Leaves glaucous, prickly, sinuate-pinnatifid. Flowers yellow. Stigmas red. Capsules erect, prickly, dehiscing by valves. Seeds black.

Introduced from Mexico. Common in waste places, fallow fields and along roadsides. Often appears on recently disturbed soils and can be seen on the Old Delhi Ridge near the Reservoir. The latex is used in dropsy, jaundice and eye troubles. Stewart (loc. cit.) reports that near Delhi, an oil is extracted from seeds which is used for burning and is applied medicinally ; dishonest merchants use the oil to adulterate edible oils, but the oil is dangerous.

Local name : Untkatera ; Kateli ; Kandari

Flowers and Fruits : Oct.-April

J. K. Maheshwari 27

A. ochroleuca Sweet, Brit. Fl. Gard. 3 : t. 242, 1828 ; Ownbey in Mem.

Torr. Bot. Club 21 : No. 1, 1958.

Differs from the preceding species in its whitish flowers and has

recently been shown to be cytologically a distinct species, being octoploid (Malhotra, 1960).

A recently introduced weed; occurs rarely in waste places and on recently disturbed soils. Natural hybrids between *A. mexicana* and *A. ochroleuca* are met with in the area.

Flowers and Fruits : Oct.-April

Papaver Linn.

P. somniferum Linn. Sp. Pl. 508, 1753; FBI. 1 : 117; FUGP. 1 : 36.

A glaucous, erect annual. Leaves amplexicaul, lobed. Flowers large, white, red, purple or scarlet. Capsules stalked, globose. Seeds white or black.

Cultivated on a small scale for its latex and seeds.

Local name : Post ; Afim ; English name : Opium Poppy

Flowers and Fruits : Jan.-April

J. K. Maheshwari 1378

7. Fumariaceae

Fumaria Linn.

F. indica (Haussk.) Pugsley in JLS. 44 : 313, 1919.

F. vaillantii var. *indica* Haussk. in Flora 56 : 443, 1873.

F. parviflora Wt. & Arn. Prodr. 18, 1834 (non Lamk.).

F. parviflora var. *vaillantii* Hook. f. & Thoms. Fl. Ind. 258, 1855.

F. parviflora subsp. *vaillantii* Hook. f. in FBI. 1 : 128, 1872.

A diffusely spreading, much-branched, glaucous annual. Latex watery. Leaves finely divided; segments flat. Flowers rosy-purplish, about 6 x 2 mm. Fruits globose, indehiscent, 1-seeded, about 2.5 x 2.5 mm.

Common as a winter season weed in cultivated fields and garden beds on moist, sandy soil. Appears annually in the garden beds of Delhi University Campus along with the winter ornamentals. A decoction of the plant is said to be used for blood purification.

Local name : Papra ; Kilano ; Pitpapada

Flowers and Fruits : Nov.-Feb.

J. K. Maheshwari 618, fields of Timarpur

8. Cruciferae (Brassicaceae)

1. Pods indehiscent, long or short :
2. Pods broader than long ; beak absent *Coronopus*
2. Pods elongate, beaked *Raphanus*

1. Pods dehiscent, long or short ;
3. Pods terete or compressed dorsally, many-seeded :
 4. Pods long and narrow ; seeds in 2 rows :
 5. Flowers white *Nasturtium*
 5. Flowers yellow *Rorippa*
 4. Pods long and narrow ; seeds in 1 row *Sisymbrium*
 4. Pods short and broad ; seeds 1 or 2-seriate :
 6. Hoary herbs ; flowers white ; seeds winged *Farselia*
 6. Glabrous herbs ; flowers yellow ; seeds not winged *Cochlearia*
 7. Flowers yellow ; seeds 1-seriate *Brassica*
 7. Flowers lilac or yellow with purple veins ; seeds 2-seriate *Eruca*
3. Pods short, compressed laterally, 2-seeded *Lepidium*

Coronopus Zinn nom. cons.

C. didymus (Linn.) Sm. Fl. Brit. 2 : 691, 1800 ; Exell, Cat. Vas. Pl. S. Tomé 105, 1944.

Lepidium didymum Linn. Syst. 2 : 433 & Mant. 92, 1767.

Senebiera pinnatifida DC. in Mém. Soc. Hist. Nat. Par. 144, t. 9, 1799 ; FUGP. 1 : 47.

A prostrate or ascending, branching, leafy, rather hispid herb, often forming a rosette. Leaves pinnatifid or pinnati-partite ; lobes spreading. Flowers pale green, small, sometimes apetalous, diandrous. Pods 1×2 mm., separating into 2, indehiscent, reticulate lobes. Seeds about 1×1 mm., brown.

A winter season weed. Highly variable in its size and appearance. Found in fields and open places on moist, sandy soil ; abundant in winter, rare in summer and early rainy season. The plants that survive till early summer become somewhat woody.

Local name : Jangli hala ; Panacholi ; Halo

Flowers and Fruits : Jan.-May

J. K. Maheshwari 979, University Campus

Raphanus Linn.

R. sativus Linn. Sp. Pl. 669, 1753 ; FBI. 1 : 166 ; FUGP. 1 : 48.

A coarse, fleshy-rooted annual or biennial. Roots variable in size, shape and taste. Flowers white or lilac with purple veins. Pods terete.

Cultivated during the cold season for its edible roots and young leaves. Some of the recommended, improved cultivars are : Large Crimson, Contai short, Queen of the market, Violet Giant and Chinese Rose.

Local name : Muli ; English name : Radish

Flowers and Fruits : Dec.-June
J. K. Maheshwari 568 ; 981

Nasturtium R. Br. nom. cons.

N. officinale R. Br. in Ait. f. Hort. Kew. 4 : 111, 1812 ; FBI. 1 : 133 ; FUGP. 1 : 39.

A prostrate, small herb. Leaves dark purple in colour. Flowers white, in short racemes. Pods stalked, cylindrical, 10-20 × 1.5 mm.

Found occasionally along the banks of Jamuna River in winter on wet, silty soil.

English name : Water-cress
Flowers and Fruits : February
J. K. Maheshwari 845

Rorippa Scop.

Leaf margins toothed *R. indica*
Leaf margins entire *R. montana*

R. indica (Linn.) Hiern, Cat. Afr. Pl. Welw. pt. 1, 26, Addit. & Corr., 1896.

Sisymbrium indicum Linn. Mant. 1 : 93, 1767.

Nasturtium indicum DC. Prodr. 1 : 139, 1824 ; FBI. 1 : 134 ; FUGP. 1 : 39.

An erect, glabrous or hairy annual, 15-60 cm. tall. Radical leaves pinnatifid ; lobes toothed. Upper leaves lyrate. Flowers yellow, small, in long racemes. Pods 1.2-2 × 0.15 cm., narrow, cylindrical.

Found in moist places in gardens and waste grounds. The seeds are used in the treatment of chronic fever.

Local name : Khubkalan
Flowers and Fruits : Feb.-July
J. K. Maheshwari 698 ; 926 ; 1160

R. montana Small, Fl. S.E.U.S. 1336, 1913.

Nasturtium montanum Wall. Cat. 4778, 1831, in part ; FBI. 1 : 134 ; FUGP. 1 : 40.

An erect, branching herb. Radical leaves pinnatifid or not ; lobes entire. Flowers yellow. Pods 2.5-4 × 0.15 cm., narrow, cylindrical.

Common in damp places in gardens and waste ground. It much resembles the preceding species except for the leaves.

Flowers and Fruits : Feb.-July

Sisymbrium Linn.

S. irio Linn. Sp. Pl. 659, 1753 ; FBI. 1 : 150 ; FUGP. 1 : 42.

An annual herb, highly variable, 20-60 cm. tall. Stems 2-10 mm. thick.

Leaves pinnatifid or partite; lobes distant. Flowers yellow. Pods narrow, erect, subtorulose.

Abundant in the winter season on moist soil in waste places, also in fallow and cultivated fields. Several forms differing in habit and height are known in the area. Prostrate, ascending and erect types are found in different localities.

Flowers and Fruits : Feb.-April
J. K. Maheshwari 982

Farsetia Turra

F. hamiltonii Royle, Ill. 71, 1839; FBI. 1:140; FUGP. 1:41.
An erect or ascending, branching, hoary herb. Leaves narrowly linear. Flowers whitish, small. Pods $1.2 \times 0.4-0.5$ cm., linear-oblong, pointed. Seeds deep brown, orbicular.

Found in dry, sandy or clayey soils of fields near Hauz Khas, Okhla and other urban areas. Duthie in FUGP. (loc. cit.) gives the flower colour as pink, but I have not come across this colour in the area.

Local name : Bui
Flowers and Fruits : April-Oct.
J. K. Maheshwari 318

Cochlearia Linn.

C. cochlearioides (Roth) Santapau & Mahesh. in JBNHS. 54:804, 1957.
Alyssum cochlearioides Roth, Nov. Pl. Sp. 322, 1821.

Cochlearia flava Buch.-Ham. ex Roxb. Hort. Beng. 48, 1814, nom. nud.; FBI. 1:145.

An erect, diffusely branched, glabrous annual. Roots long, fusiform. Leaves $10-13 \times 2.5$ cm., pinnatifid; lobes sinuate-toothed. Flowers yellow, small. Pods globose, smooth. Seeds rugose.

Found along river banks and in damp places.

Flowers and Fruits : Cold season
J. K. Maheshwari 1437

Brassica Linn.

Plants glaucous-blue, blue-green or glaucous-red; leaves of the floral shoots clasping or amplexicaul; flowers large, creamy-yellow, pale yellow to white; sepals erect:

Roots tuberous; leaves (except cauline ones) thin, green; foliage firm in texture; flowers smaller, bright yellow . . . *B. rapa*

Roots not tuberous; leaves thick or fleshy, glaucous:

Seeds large, mostly 2-3 mm. long, rounded, not tapering to either

end not cornered; leaves thick, fleshy, obovate or oblong;
cauline ones clasping *B. oleracea*
Seeds small, mostly less than 2 mm. long or broad, commonly
angled or cornered; lower leaves lyrate-pinnatifid, upper
ones oblong, prominently cordate-amplexicaul *B. campestris* var. *sarson*

Plants green or slightly glaucous; leaves of the floral shoots not prominently clasping; flowers small, light to medium yellow; sepals erect or spreading;

Leaves mostly in radical rosettes, green, hispid *B. tournefortii*

Leaves not as above, green or thinly glaucous:

Pods long, terete or nearly so; pedicels spreading *B. juncea*

Pods short, distinctly 4-angled; pedicels and pods appressed *B. nigra*

B. rapa Linn. Sp. Pl. 666, 1753; Bailey, Man. Cult. Pl. 436.

A tall, erect, branching annual. Stems often tinged with reddish-purple, especially at the nodes. Leaves lyrate or pinnatifid; the upper decreasing in size. Flowers white or pale yellow, stalked. Pods slender, narrow.

The tender roots are cooked as vegetable and used as forage.

Local name: Shalgam; English name: Turnip

Flowers and Fruits: Dec.-March

B. oleracea Linn. Sp. Pl. 667, 1753; Bailey, op. cit. 435.

Flowers large, creamy yellow. Petals long-clawed.

Probably a native of Persia and the western parts of Asia. Found in India only in cultivation. The following varieties are grown in the State:

1. Var. *capitata* Linn. Sp. Pl. 667, 1753; Blatt. in JBNHS. 34:297, 1930.

Native of Europe and Asia. Stems short and thick. Leaves closely packed into a large bud or head.

The cultivars Savoy Perfection, Drum Head, Golden Acre, Sugar Loaf, London Market, World Beater and Copenhagen Market have given good results in the area and are available in the market from January to March.

English name: Cabbage

Local name: Bandhagobhi

2. Var. *botrytis* Linn. Sp. Pl. 667, 1753; Bailey, op. cit. 436.

Native of W. Europe. The head is formed of condensed and thickened flower clusters. The recommended cultivars in the State are: Early London, Early Snowball and Large Whitecape. Available in the market during October and November.

English name : Cauliflower and Broccoli
Local name : Phoolgobhi

3. Var. *gemmifera* Zenker ; Bailey, op. cit. 435.
Cultivated in Europe and Asia. Stems tall and erect. Axillary buds developed into long heads. Available in the month of February.
English name : Brussels Sprouts or Bud-bearing Cabbage

4. Var. *caulorapa* DC. Prodr. 1 : 214, 1824; Bailey, Stand. Cycl. Hort. 1757.
Native of Asia. Available from December to March.
Local name : Ganthgobhi ; Knol-kohl

B. campestris Linn. var. *sarson* Prain in Dept. Land Rec. & Agric. Bengal, Bull. No. 4: 24, tt. 5-7, 1898 ; FUGP. 1 : 45.
An erect, tall annual. Lower leaves large, lyrate-pinnatifid ; upper smaller. Flowers bright yellow, in corymbs elongating into racemes. Pods various ; beak conical, stout. Seeds yellowish or brown.
A common cold season crop in the fields of Timarpur, Najafgarh, Shahdara, and those near Ghaziabad. It is grown in rotation with Jowar (*Sorghum vulgare* Pers.), Bajra (*Pennisetum typhoides* Stapf & C. E. Hubb.), maize (*Zea mays* Linn.), sugarcane (*Saccharum officinarum* Linn.) and edible legumes. The crop is harvested in April and May. The young parts of the plant make a favourite vegetable dish in the Punjab. Seeds are used for oil extraction. Old woody parts are used as fuel.

Local name : Sarson
Flowers and Fruits : Jan.-April
J. K. Maheshwari 789

B. tournefortii Götlan, Ill. 44, t. 20A, 1773 ; FBI. 1 : 156 ; FUGP. 1 : 46.
This species was collected by Jacquemont (in Duthie's FUGP, loc. cit.) between Ajmer and Delhi. Commonly grown in the Punjab on the borders of fields (Zafar Alam in Ind. Jour. Agric. Sci. 15 : 173-181, 1945). I have not seen the plant growing in the field.

An erect, branching, hispid or glabrate annual, about 30 cm. tall. Radical leaves forming a rosette, runcinate-lyrate ; lobes toothed. Flowers pale yellow. Pods erect, slender, glabrous, beaked.

Local name : Rai

B. juncea (Linn.) Czern. & Coss. ; Czern. Consp. Pl. Chark. 8, n. 5, 1859 ; Coss. in Bull. Sec. Bot. France 6 : 609, 1859 ; Hook. f. & T. Anders. in FBI. 1 : 157, in part.

Sinapis juncea Linn. Sp. Pl. 668, 1753, excl. syn. Herm.

Brassica juncea Hook. f. & Thoms. in JLS. 5 : 170, 1861, in part ; FUGP. 1 : 44.

A tall, erect, branching annual, 90-150 cm. tall. Stems often tinged

with reddish-purple, especially at the nodes. Leaves large; lower ones petiolate, lyrate or pinnatifid; the upper decreasing in size. Flowers bright yellow, 8 mm. across. Sepals spreading. Pods narrow, torulose; beak narrowly conical.

Cultivated for its seeds.

Local name : Raya

Flowers and Fruits : Dec.-March

J. K. Maheshwari 931

B. nigra Koch in Roehl. Deutschl. Fl. 4 : 713, 1833 ; FBI. 1 : 156 ; FUGP. 1 : 44.

A rigid, branching annual, 60-100 cm. high. Leaves petiolate; lower ones lyrate, upper entire. Flowers bright yellow, in naked racemes. Pods subulate, appressed to the stem, torulose.

Cultivated for its seeds which are commonly known as 'Black Mustard' of commerce.

Local name : Poorbirai

Flowers and Fruits : Feb.-April

J. K. Maheshwari 1425

Eruca Adans.

E. sativa Mill. Gard. Dict. n. 1, 1768 ; FBI. 1 : 158.

An erect, branching annual. Leaves lyrate-pinnatifid; margins entire or coarsely toothed; petioles winged. Flowers whitish or yellow with darker veins, up to 2.5 cm. long. Petals clawed. Pods erect, appressed against the stems, oblong-ovoid, about 2.5×0.5 cm.; beak about half the length of fruit, flat.

Cultivated as a cold season crop in the fields of Timarpur, Najafgarh, Shahdara and Ghaziabad with *Brassica campestris* var. *sarson* Prain, *Cicer arietinum* Linn., and *Hordeum vulgare* Linn. The oil from the seeds is used mainly for burning and probably adulterated with sarson oil. The plant is used for fodder.

Local name : Tara ; Taramira

Flowers and Fruits : Feb.-March

J. K. Maheshwari 607 ; 804, fields near Faridabad

Lepidium Linn.

L. sativum Linn. Sp. Pl. 644, 1753 ; FBI. 1 : 159 ; FUGP. 1 : 48.

An erect, glabrous annual. Radical leaves divided; cauline ones often entire. Flowers white or pinkish, small, in long racemes. Pods oblong-orbicular, notched, 2-seeded, 5×3.5 mm.; valves margined.

Not grown as a crop but found as a weed of cultivation in the fields of cold weather crops.

Local name : Hala ; Tarateji ; Alsa
 Flowers and Fruits : Feb.-May
 J. K. Maheshwari 606

9. Capparidaceae (Capparaceae)

- Herbs ; fruit capsular :
 Gynophore absent
 Gynophore present
 Shrubs or trees ; fruit a berry : *Cleome*
 Sepals united at the base ; fruit moniliform *Gynandropsis*
 Sepals free ; fruit globose or ovoid, but not moniliform : *Maerua*
 Leaves simple ; stipular thorns present ; small trees or large shrubs,
 the latter sometimes scandent
 Leaves trifoliate ; large, unarmed trees *Capparis*
Crataeva

Cleome Linn.

Stamens 6 ; capsules long-beaked, usually less than 1.5 cm. long

Stamens 12 or more ; capsules short-beaked, usually more than 2.5 cm. long *C. brachycarpa*

C. brachycarpa Vahl ex DC. Prodr. 1 : 240, 1824 ; FBI. 1 : 169 ; FUGP. 1 : 50. *C. viscosa*

A strongly-scented, glandular, scabrous herb, 15 cm. high, branching from the base. Leaves usually 3-foliate. Leaflets 5-15 × 5-8 mm., obovate. Flowers yellow. Capsules long-beaked, about 1 × 0.4 cm., rough. Seeds smooth.

Common during the monsoon period in the crevices of the stairs of Suraj Kund, near Gurukul (Faridabad), often growing with *Lindenbergia indica* Kuntze, and *Verbascum chinense* Santapau. The plant gives a characteristic, musky odour.

Flowers and Fruits : July-Nov.

J. K. Maheshwari 722

C. viscosa Linn. Sp. Pl. 672, 1753 ; FBI. 1 : 170 ; FUGP. 1 : 50.

An erect, branching, glandular-pubescent herb, 10-60 cm. high. Leaves 3 to 5-foliate, variable in shape. Flowers yellow, solitary, axillary or in leaf-bearing, terminal racemes. Stamens 17-20. Capsules sticky-pubescent, erect, straight or subarched, short-beaked. Seeds dark brown, reniform.

It comes up soon after the first monsoon showers and is found on drying up sandy soils. A common weed in fields and waste places. The juice of the leaves is said to be used in ear troubles. The seeds are sold in the market.

Local name : Hulhul
Flowers and Fruits : July-Oct.
J. K. Maheshwari 254

Gynandropsis DC. nom. cons.

G. gynandra (Linn.) Briq. in Ann. Cons. Jard. Bot. Genève 17 : 382, 1914;
Santapau in RBSE 16(1) : 10, 1953.

Cleome gynandra Linn. Sp. Pl. 671, 1753.

Gynandropsis pentaphylla DC. Prodr. 1 : 238, 1824 ; FBI. 1 : 171 ;
FUGP. 1 : 51.

An erect or ascending, glandular-pubescent annual, up to 60 cm. tall, branching from the base. Leaves digitately 5-foliolate. Leaflets 5-6.5 × 2-3 cm. Flowers white, cream-coloured or pinkish, bisexual to polygamous, in corymbose racemes. Capsules 4-8 × 0.3-0.5 cm.

A common weed of waste lands and cultivated fields. The plant shows numerous variations and abnormalities in the structure of the flower. Besides the normal type of bisexual flowers, there occur staminate ones with abortive or functional and stalked or sessile anthers. It is primarily a rainy season annual, but some plants continue to flower and fruit till late in the winter.

Local name : Hulhul
Flowers and Fruits : June-Sept.
J. K. Maheshwari 49

Maerua Forsk.

M. arenaria Hook. f. & Thoms. var. *scabra* Hook. f. & Thoms. in FBI. 1 : 171, 1872 ; FUGP. 1 : 51.

Niebuhrria oblongifolia Royle, Ill. 73, 1839.

A woody, pubescent, straggling shrub, climber or liana. Bark grey-white to dull black. Young shoots and leaves scabrous. Calyx soft pubescent. Flowers greenish-yellow. Berries moniliform and deeply constricted between the seeds.

A liana climbing on the common trees of the Ridge. In the absence of proper support, it spreads on the ground. As a straggling shrub it occurs often mixed with *Capparis sepiaria* Linn. Also common in waste places in dry, sandy soils.

Flowers and Fruits : Late winter and summer seasons
J. K. Maheshwari 985

Capparis Linn.

Older branches leafless ; flowers red *C. decidua*
Older branches leafy ; flowers white *C. sepiaria*

C. decidua (Forsk.) Edgew. in JLS. 6 : 184, 1862 ; Pax in Engl. & Prantl, Nat. Pfam. 3(2) : 230, 231, f. 139, 1891.
Sesada decidua Forsk. Fl. Aegypt.-Arab. 81, 1775.
Capparis aphylla Roth, Nov. Pl. Sp. 238, 1821 ; FBL. 1 : 174; FUGP. 1 : 53.

A leafless, diffuse, much-branched, spinous shrub or small tree, struggling, twining or suffrutescent. Thorns paired, short, straight or recurved. Juvenile leaves caducous, pungent. Flowers red or scarlet, often produced in abundance in lateral corymbs. Ovary stipitate. Fruits 1.2×1.5 cm., globose or ovoid, red when ripe.

Common on the Ridge and in other drier parts, either growing alone on the ground or hanging from the crevices of ancient walls or in clumps with *Salvadora persica* Linn., *S. oleoides* Decne., *Acacia leucophloea* Willd., and *Prosopis spicijera* Linn. At places it is seen as a liana with a thick woody stem or as a small tree about 4 m. high. The top shoots and young leaves are powdered and used by the local people as blister in boils, eruptions and swellings. The flowers, buds, and green and mature fruits are pickled. The fruits are sold in the market.

Local name : Karel; Kair; Karir; Dola

Flowers and Fruits : Jan.-Aug.

J. K. Maheshwari 9 : 714; 984

C. seplaria Linn. Syst. 1071, 1759 ; FBL. 1 : 177 ; FUGP. 1 : 53 ; Parker, For. Fl. 20.

A spreading, branched, diffuse or climbing shrub. Branches subflexuous. Thorns paired, recurved. Leaves $2.5-5 \times 1.5-3$ cm., ovate-lanceolate or elliptic. Flowers white, in many-flowered, terminal umbels. Berries deep purple, $0.7-1 \times 0.7-1$ cm., globose.

Very common and abundant on the Ridge as well as in other parts on dry situations. Also planted for hedges, especially along the fruit orchards. As a climber it is found on *Acacia leucophloea* Willd., *Ehretia laevis* Roxb., and other trees. The berries are sweet when ripe.

Local name : Heens

Flowers and Fruits : May-July

J. K. Maheshwari 273 ; 374 ; 1208

Crataeva Linn.

C. nurvala Buch.-Ham. in TLS. 15 : 121, 1827 ; Blatt. & Mill. Beaut. Ind. Tr. 47, t. 9.

Capparis trifoliata Roxb. Hort. Beng. 41, 1814, nom. nud. & Fl. Ind. 2 : 571, 1832.

Crataeva religiosa auct. (non Forst).

An erect or crooked, medium-sized, unarmed, deciduous tree, branching high above the ground. Bark grey-white or ash-coloured. Leaves

3-foliolate. Leaflets $6-13 \times 3.5$ cm., ovate-lanceolate. Flowers greenish-yellow, appearing either before or with the leaves. Berries deep orange, foetid-smelling.

Cultivated in gardens; also planted on the Ridge where it flowers and fruits in a semi-wild state. The tree is becoming naturalized on the Ridge and self-sown, young plants are often met with.

Local name : Barna
Flowers : April-May. Fruits : June-July
J. K. Maheshwari 257

10. Resedaceae

Oligomeris Camb. nom. cons.

O. linifolia (Vahl) Macbride in Contr. Gray Herb. (n.s.) 53 : 13, 1918 ; Cufodontis in Bull. Jard. Bot. Brux. Suppl. 24 : 161, 1954.

Reseda linifolia Vahl in Hornemann, Hort. Hafn. 2 : 501, 1814.

Oligomeris glaucescens Camb. in Jacq. Voy. Bot. 24, t. 25, 1844; FBL 1 : 181 ; FUGP. 1 : 54.

An erect, glaucous, much-branched annual, 15-30 cm. high. Leaves narrowly linear, $2.5-7.5 \times 0.2$ cm. Flowers greenish, bracteate, in terminal, dense-flowered spikes. Ovaries open at the apex. Capsules small, deeply 4-lobed. Seeds many, shining.

Uncommon ; collected once from the fields of Todapur, near I.A.R.I.

Flowers and Fruits : Feb.-May
J. K. Maheshwari 1406, Todapur

11. Violaceae

Hybanthus Jacq.

H. enneaspermus (Linn.) F. Muell. Fragm. 10 : 81, 1877.

Viola enneasperma Linn. Sp. Pl. 937, 1753.

Ionidium enneaspermum (Linn.) Vent. Jard. Malm. sub t. 27, 1803.

I. suffruticosum Ging. in DC. Prodr. 1 : 311, 1824.

I. heterophyllum Vent. Jard. Malm. 27, 1803 ; FUGP. 1 : 56.

The plant is included on the authority of Duthie in FUGP. (loc. cit.). I have not seen any specimens from Delhi.

A glabrous or pubescent herb. Branches diffuse, woody. Leaves linear or lanceolate, serrate ; stipules subulate. Flowers red, solitary. Petals variable, one with a long claw and a large oval or orbicular limb. Seeds striate.

Local name : Ratanpurus

12. Flacourtiaceae

Flacourtia Commers.

F. indica (Burm. f.) Merr. Interpret. Herb. Amb. 377, 1917 & Enum. 3 : 112.

Gmelina indica Burm. f. Fl. Ind. 132, t. 39, f. 5, 1768.

Flacourtia sepiaria Roxb. Pl. Cor. 1 : 48, t. 68, 1796.

F. ramontchi L'Hérit. Stirp. 59, t. 30, 1786.

F. latifolia Cooke, Fl. Pres. Bomb. 1 : 56, 1901.

A much-branched, thorny bush or small tree; the branchlets terminating in sharp, rigid, needle-like, 1.5-4 cm. long spines. Leaves glabrous, ovoid-ovate or suborbicular, puberulous especially on the veins, often cuncate at base, crenate-serrate. Styles 4-5, short. Drupes globose, purple, 7 mm. in diam.

Found on the New Delhi Ridge as well as on the arid, hilly tracts near Mehrauli, growing alone or with *Capparis sepiaria* Linn. The fruits are edible and used as cooling medicine.

Local name : Khatai

Fruits : Summer

J. K. Maheshwari 825, near Faridabad ; 1071, Kitchener Road ; 1152, Mehrauli

13. Polygalaceae

Polygala Linn.

Capsule hairy ; caruncle appendaged or not :

Flowers pink ; caruncle 3-lobed *P. chinensis*

Flowers yellow or mauve ; caruncle appendages absent *P. erioptera*

Capsule glabrous ; caruncle minutely appendaged *P. telephioides*

P. chinensis Linn. Sp. Pl. 704, 1753 ; FBI. 1 : 204 ; FUGP. 1 : 62.

A stout, diffuse, branching herb, 8-30 cm. long. Branches spreading or ascending. Leaves 1-2.5 cm. long. Flowers pink, pendulous. Capsules oblong, notched, ciliate on the margins. Seeds oblong, silky ; strophiole 3-lobed.

Found during the monsoon period from the Jamuna River to the hilly tracts of Delhi, commonly on grassy lawns and grounds, often hidden amongst the grasses. The roots of *P. chinensis* Linn., *P. crotalarioides* Buch.-Ham., and *P. telephioides* Willd. are said to contain saponin-like substances and were used as substitute for the Senega obtained from the American plant—*P. senega* Linn.

Flowers and Fruits : Aug.-Oct.

P. eriopetra DC. Prodr. 1 : 326, 1824 ; FBI. 1 : 203 ; FUGP. 1 : 62.

An erect or decumbent annual, very variable in habit. Leaves obovate or almost obovate to narrow-linear. Flowers yellow or pinkish. Wings petaloid. Strophiole without appendages.

Common along river banks, and on grassy lawns and grounds, often hidden amongst the grasses. Var. *vahlana* (DC.) Chodat, is also reported from Delhi by Mukerjee (1958).

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 382

P. telephioides Willd. Sp. Pl. 3 : 876, 1802 ; FBI. 1 : 205 ; FUGP. 1 : 63.

Royle in FUGP. (loc. cit.) is the only authority for this species from Delhi. I have not come across any specimens of this plant.

A dwarf, prostrate, perennial herb, 5-10 cm. high. Leaves obovate or oblong ; margins usually recurved. Flowers fascicled on short, extra-axillary peduncles. Wings herbaceous. Capsules broadly ovoid.

14. Caryophyllaceae

| | |
|-------------------------------------|--------------------|
| Sepals united | <i>Vaccaria</i> |
| Sepals free : | |
| Styles free : | |
| Stipules absent : | |
| Petals split to the base | <i>Stellaria</i> |
| Petals entire | <i>Arenaria</i> |
| Stipules scarious | <i>Spergula</i> |
| Styles connate, 3-fid or -dentate : | |
| Sepals keeled on the back, fleshy | <i>Polycarpon</i> |
| Sepals not keeled, scarious | <i>Polycarpaea</i> |

Vaccaria Medik.

V. pyramidata Medik. Phil. Bot. 1 : 96, 1789 ; Cusodotis in Bull. Jard. Bot. Brux. Suppl. 23 : 104, 1953.

Saponaria vaccaria Linn. Sp. Pl. 409, 1753 ; FBI. 1 : 217 ; FUGP. 1 : 64.

An erect, glabrous annual, 60 cm. or more tall. Leaves linear-oblong. Flowers pink. Calyx tubular, with five, green nerves, swollen in fruit. Capsules ovoid. Seeds black.

A common winter season weed in grain fields and garden beds. Can serve as an ornamental herb for its beautiful flowers.

Flowers and Fruits : Feb.-March

J. K. Maheshwari 609

Stellaria Linn.

media (Linn.) Vill. Hist. Pl. Dauph. 3 : 615, 1789 ; FBI. 1 : 230 ; FUGP. 1 : 66.

Alsine media Linn. Sp. Pl. 272, 1753.

An annual, decumbent, glabrous, branching herb. Leaves ovate or cordate. Flowers white, axillary and in cymes. Capsules ovoid.

A common winter season weed in fallow and cultivated fields, lawns, gardens and waste places on moist soil. Grows alone or associated with *Spergula arvensis* Linn.

Local name : Safed-phul-kee; Buchbucha ; Pani
Flowers and Fruits : Dec.-March
J. K. Maheshwari 569

Arenaria Linn.

A. serpyllifolia Linn. Sp. Pl. 423, 1753 ; FBI. 1 : 239 ; FUGP. 1 : 66.

A small, decumbent or suberect, much-branched, tufted annual. Branches glandular throughout. Leaves 5-9 x 3-4 mm., ovate or elliptic-ovate. Flowers white, 3 x 3 mm., in many-flowered cymes. Stamens 5-6; anthers pinkish or whitish. Styles 3. Capsules ovoid. Seeds black, tubercled.

Less common than *Spergula arvensis* Linn. and *Stellaria media* Vill. Found as a weed in moist places towards the end of cold season.

Flowers and Fruits : Feb.-March

Spergula Linn.

S. arvensis Linn. Sp. Pl. 440, 1753 ; FBI. 1 : 243 ; FUGP. 1 : 67.

A glabrous, diffuse, branching annual. Leaves linear-subulate, in false whorls. Flowers white, 4-5 mm. across. Stamens 10 in two whorls; anthers yellow. Styles 3, free to the base. Capsules ovoid, glabrous. Seeds black, shining.

Occurs as a winter weed in cultivated and fallow fields; found in moist localities.

Local name : Muchmuchia ; Khandidal

Flowers and Fruits : Dec.-March

J. K. Maheshwari 573

Polycarpon Linn.

P. prostratum (Forsk.) Pax in Engl. & Prantl, Nat. Pfam. 3 (1b) : 87, 1889; Cusodontis in Bull. Jard. Bot. Brux. Suppl. 23 : 97, 1953.

Alsine prostrata Forsk. Fl. Aegypt.-Arab. 207, 1775.

Polycarpon loeflingii Edgew. & Hook. f. in FBI. 1 : 245, 1874.

P. depressum Rohrb. in Mart. Fl. Bras. 14 : 257, 1872 (non Nutt. 1838).

P. indicum Merr. in Philip. Jour. Sci. (Bot.) 10 : 30, 1905 & Enum. 2 : 139.

A prostrate, much-branched, glabrous or hairy herb. Leaves appearing whorled, spatulate. Flowers small, in numerous-flowered, crowded cymes. Sepals persistent. Petals hyaline, shorter than the sepals. Capsules subglobose.

Rare. It is found in the pre-monsoon and monsoon period on dry soil and on drying fields and puddles, often associated with *Polygonum plebeium* R. Br., which it resembles in appearance. It is distinguishable from the latter by its multi-flowered cymes, keeled sepals and hyaline petals. Also found hidden amongst bushes and tall grasses, along the dried canal banks of Najafgarh.

Flowers and Fruits : May-Oct.

J. K. Maheshwari 1215

Polycarpha Lamk. nom. cons.

P. corymbosa (Linn.) Lamk. Tabl. Encycl. 2: 129, 1791; FBL. 1: 245; FUGP. 1: 68; Merr. Enum. 2: 139.

Achyranthes corymbosa Linn. Sp. Pl. 205, 1753.

An erect, much-branched, slender herb. Leaves 1-2.5 cm. long, clustered, narrowly linear. Flowers white with a pinkish tinge, crowded on the cyme branches forming large, silvery heads. Sepals chaffy, much exceeding the capsules. Capsules 3-valved.

Common on moist or dry, sandy-clayey soils of fallow and cultivated fields. It is said to be useful against acute fever.

Local name : Mahechi ; Dholphuli

Flowers and Fruits : Aug.-Nov.

J. K. Maheshwari 333 ; 1299

15. Portulacaceae

Portulaca Linn.

Flowers solitary, terminal

Flowers in terminal clusters :

Flowers yellow

Flowers rose-coloured

P. quadrifida

P. oleracea

P. grandiflora

P. quadrifida Linn. Mant. 1: 73, 1767; FBL. 1: 247; FUGP. 1: 70.

A prostrate, filiform annual, rooting at the nodes. Leaves subsessile, flat, succulent, ovate to ovate-lanceolate, much smaller than those of *P. oleracea* Linn. Stipular appendages with a ring of hairs. Flowers yellow, solitary, terminal. Seeds tubercled.

A common weed on moist soil in garden beds and fields where it spreads rapidly forming a carpet. The flowers open at noon.

Flowers and Fruits : Sept.-Oct.
J. K. Maheshwari 28 ; 249, Timarpur

P. oleracea Linn. Sp. Pl. 445, 1753 ; FBI. 1 : 246 ; FUGP. 1 : 69.

A prostrate or ascending, glabrous annual, more or less succulent. Leaves oblong-obovate, linear or spatulate, succulent. Flowers yellow. Sepals fleshy. Petals 5, notched. Seeds muriculate.

Common throughout in sandy, silty and gravelly soils. Found as a weed in cultivated and fallow grounds and also in waste places. Used as a pot herb.

Local name : Kulfa ; Salunak ; Nunka
Flowers and Fruits : During the greater part of the year
J. K. Maheshwari 29

P. grandiflora Hook. in Bot. Mag. t. 2885, 1829 ; Bailey, Man. Cult. Pl. 365.

A succulent, prostrate or ascending, glabrous herb. Branches many from the base. Leaves linear-lanceolate, borne all round the stem, very shortly petiolate, subterete. Flowers rose-purple or deep pink, in terminal, sessile clusters. Sepals 2, broad ovate. Petals 5, spreading, fan-shaped, notched. Stamens 10 ; anthers yellow ; filaments purple. Style solitary, broader above. Stigmas 4, coiled or decurved. Seeds reniform, tubercled, black.

Common on the Ridge during the monsoon period, spreading upon stones or growing under the shade of bushes. The flowers are attractive and the plant is grown as a pot herb.

Local name : Lunia
Flowers and Fruits : Aug.-Oct.
J. K. Maheshwari 1245

16. Tamaricaceae

Tamarix Linn.

Leaf sheaths lacking ; flowers bisexual, in slender spikes . . . *T. troupii*

Leaf sheaths present ; flowers bisexual or unisexual :

Shrubs ; flowers dioecious, in dense cylindrical spikes ; leaves and sheaths impressed-glandular *T. dioica*

Trees ; flowers bisexual or unisexual, in lax, racemose panicles

. *T. aphylla*

T. troupii Hole in Ind. For. 45 : 248, 1919 ; Troup, Silv. Ind. Trees 1 : 16 ; Blatt. in JBNHS. 34 : 305, 1930.

T. gallica auct. (non Linn.).

A bushy shrub. Branches slender, articulated. Leaves minute, not sheathing, subulate. Flowers pink, bisexual, numerous, shortly pedicel-

late, on long, very slender, spike-like racemes of terminal panicles. Sepals persistent. Stamens 5. Seeds plumose-hairy.

Common in sandy and gravelly places subject to periodic inundation in the Jamuna-Khadar area, often seen as the dominant plant in such spots. Also found in low-lying saline soils. According to Hole (loc. cit.) the true *T. gallica* does not occur in India and the species so far designated as *T. gallica* Linn. from the plains of West India is *T. troupii* Hole.

Local name : Jhau

Flowers and Fruits : Aug.-Sept.

J. K. Maheshwari 165

T. dioica Roxb. Hort. Beng. 22, 1814, nom. nud. & Fl. Ind. 2 : 101, 1832; FBI. 1 : 249; FUGP. 1 : 71; Parker, For. Fl. 26.

A shrub, 1-2 m. tall, with spreading or drooping branches. Leaves minute, closely appressed. Flowers purple or rosy, dioecious, in compact, cylindrical, loosely panicle, 5-9 x 0.3-0.6 cm. spikes; bracts triangular. Capsules oblong.

Found in low-lying areas and near the banks of Jamuna River and near Okhla Waterworks, dominating the vegetation. A graceful shrub when in full bloom.

Local name : Jhau

Flowers and Fruits : July-Oct.

J. K. Maheshwari 166

T. aphylla (Linn.) Lanza in Boll. Orto Bot. Palermo 8 : 82, 1909.

Phaya aphylla Linn. Cent. Pl. 1 : 32, 1755.

Tamarix articulata Vahl, Symb. Bot. 2 : 48, t. 32, 1791; FBI. 1 : 249; FUGP. 1 : 72.

A moderate-sized, coniferous-looking tree, easily mistaken for *Casuarina*, fir or pine, attaining a height of about 6 m. in the area. Trunk erect. Branches articulate at the base of sheath. Leaves sheathing; sheath and tooth with impressed glands. Flowers pink, loosely scattered on long, slender spikes arranged in loose panicles; bracts shorter than the flowers. Stamens 5. Capsules sessile, broadly ovate.

The tree has probably been planted in the area. Grows very well in the saline areas of Okhla.

Local name : Farash

Flowers and Fruits : June-Oct.

J. K. Maheshwari 176

17. Flatinaceae

Bergia Linn.

B. ammanoloides Roxb. Hort. Beng. 34, 1814, nom. nud. & Fl. Ind. 2 : 457, 1832; FBI. 1 : 251; FUGP. 1 : 73; Merr. Enum. 3 : 102.

An erect or decumbent, hairy herb, 10-30 cm. tall. Leaves sessile, linear-lanceolate or oblanceolate, sharply serrate. Flowers red, small, in dense, axillary fascicles. Capsules 5-celled. Seeds ovoid. Abundant in the fallow fields of village Gheora as well as in marshy or moist, sandy-clayey soils of other parts. It resembles *Ammanula baccifera* Linn. in habit and inflorescence, from which it is distinguishable by the serrate leaves and the presence of petals.

Flowers and Fruits : Nov.-May
J. K. Maheshwari 565, Shahdara

18. Malvaceae

1. Herbs or shrubs ; leaves simple, entire, lobed or palmatifid
2. Fruits schizocarpic, i.e. ripe carpels separating from the axis :
 3. Bracteoles 0 :
 4. Carpels 5-10, 1-seeded *Sida*
 4. Carpels 5-many, 2-seeded *Abutilon*
 3. Bracteoles 3 :
 5. Leaves orbicular, palmately veined and lobed ; flowers white *Malva*
 5. Leaves ovate-lanceolate, pinnately veined ; flowers yellow *Malvastrum*
 3. Bracteoles 5 or more :
 6. Leaves glandular at the base of the midrib beneath ; bracteoles 5 *Urena*
 6. Leaves eglandular ; bracteoles 5-many *Pavonia*
 2. Carpels connate into a berry-like body, but later separating ; flowers opening slightly *Malva viscosa*
2. Fruits capsular :
 7. Ovary 10-celled ; bracteoles 10 *Decaschistia*
 7. Ovary 5-celled :
 8. Bracteoles 5 or more or 0 :
 9. Calyx persistent *Hibiscus*
 9. Calyx falling off after anthesis *Abelmoschus*
 8. Bracteoles 3, large, persistent *Gossypium*
1. Trees ; leaves cordate, ovate, entire or lobed *Thespesia*

Sida Linn.

Procumbent, trailing herbs *S. veronicifolia*

Erect, robust herbs or undershrubs :

Spiny tubercles present below the petioles *S. spinosa*

Spines absent :

Awns short :

Leaves broadly obovate, hoary beneath ; peduncles jointed near the middle *S. rhombifolia* var. *obovata*

Leaves ovoid to oblong-ovate, downy on both surfaces

S. grewioides

Awns exceeding the calyx ; leaves downy on both surfaces

S. cordifolia

S. veronicifolia Lamk. Encycl. 1 : 5, 1783 ; FUGP. 1 : 80 ; Parker, For. Fl. 34.

A deep-rooted, trailing herb with several branches from the root stock, loosely hairy throughout. Leaves broad ovate to suborbicular, cordate, crenate-serrate, 2.4 × 2.3.5 cm. Flowers pale orange, about 1 cm. across, usually solitary, axillary on long pedicels. Ripe carpels 5, smooth, shortly mucronate.

Common throughout, especially in moist, shady places and often hidden amongst grasses.

Flowers and Fruits : June-Oct.

J. K. Maheshwari 84 ; 729

S. spinosa Linn. Sp. Pl. 683, 1753 ; FBI. 1 : 323 (excl. syn. *S. alnifolia* Linn.) ; FUGP. 1 : 80 ; Parker, For. Fl. 34.

S. alba Linn. Sp. Pl. 960, 1762.

A woody, much-branched herb or undershrub. Stems and branches rough, with spiny tubercles at the nodes below the petioles. Leaves ovate to ovate-lanceolate, crenate-serrate, glabrous above. Flowers white. Ripe carpels 5, topped by two, erect, rough beaks.

Common in the village Vallabgarh along the edges of cultivated fields and near canal banks. Also met on waste manure heaps in the University Compound.

Flowers and Fruits : Sept.-Oct.

J. K. Maheshwari 1294

S. rhombifolia Linn. var. *obovata* Mast. in Hook. f. FBI. 1 : 324, 1874 ; FUGP. 1 : 81 ; Parker, For. Fl. 35.

Much-branched undershrub. Branches ascending. Leaves variable, broadly obovate or nearly orbicular, hoary beneath ; base cuneate ; margins toothed at least in the upper half. Flowers pale orange, axillary or clustered at ends of branches ; peduncles jointed near the middle. Carpels usually 5, each shortly 2-awned.

Common in waste ground near gardens, open fields and along canal banks. Comes annually in the University Campus in the hedges of the Cricket Ground.

Flowers and Fruits : Sept.-Oct.

J. K. Maheshwari 401 ; 517 ; 1313

S. grewioides Guill. & Perr. Fl. Seneg. Tent. 1 : 71, 1831 ; FBI. 1 : 323 ; FUGP. 1 : 81 ; Parker, For. Fl. 36.

A hoary-tomentose undershrub. Leaves ovoid to oblong-ovate, obtuse, crenate, downy on both surfaces. Flowers pale yellow. Carpels wrinkled, nearly indehiscent, mucous, 3×2 mm. ; beaks connivent. Not common ; found scattered here and there in gardens, under the shade of bushes in hilly tracts, near edges of fields and in waste localities.

Local name : Kharenti

Flowers and Fruits : Feb. and Oct.

J. K. Maheshwari 808 ; 1327

S. cordifolia Linn. Sp. Pl. 684, 1753 ; FBI. 1 : 324 ; FUGP. 1 : 82 ; Parker, For. Fl. 36.

A robust herb or small, diffuse shrub, much-branched from the base. Leaves ovate, cordate, crenate-serrate, stellate-hairy on both sides. Flowers white or pale yellow. Peduncles jointed near the flower. Ripe carpels 5, 4×2 mm. (excluding awns), each 2-awned ; awns exceeding the calyx.

Common all over the area during the monsoon and post-monsoon period, along field borders, in hedges, along roadsides and in waste ground on damp, sandy soils. The seeds are used in leucorrhoea, spermatorrhoea and gonorrhoea.

Local name : Kharenti ; Bijband

Flowers and Fruits : Sept.-Dec.

J. K. Maheshwari 351

Abutilon Gaertn.

Carpels 15 or more :

Carpels exceeding the calyx, awned :

Peduncles usually longer than the petioles ; carpels reniform

Peduncles shorter than the petioles ; carpels oblong *A. indicum*

Carpels shorter than the calyx, awnless *A. bidentatum*

Carpels less than 15 *A. glaucum*

A. indicum (Linn.) Sweet, Hort. Brit. 54, 1827 ; FBI. 1 : 326 ; FUGP. 1 : 83 ; Parker, For. Fl. 37 ; Merr. Enum. 3 : 32.

Sida indica Linn. Cent. Pl. 2 : 26, 1756.

A robust shrub or undershrub. Branches many. Leaves ovate to orbicular-cordate, soft. Flower buds drooping. Flowers orange-yellow, on long pedicels. Ripe carpels 15-20, black at maturity, reniform, short-beaked. Seeds black, tubercled.

Common all over the area in hedges of gardens and in waste places. The flowers open at noon.

Local name : Kanghi ; Aphra
 Flowers and Fruits : Major part of the year
 J. K. Maheshwari 74

A. bidentatum Hochst. ex A. Rich. Tent. Fl. Abyss. 1 : 68, 1847 ; FBI. 1 : 326 ; Parker in Ind. For. 46 : 23, 1920.

Parker (loc. cit.) describes this plant as fairly common, but I have not collected any specimens myself.

An erect perennial. Leaves cordate-ovate, downy on both surfaces. Panicles axillary. Ripe carpels 20, smooth, exceeding the calyx ; awns spreading.

A. glaucum (Cav.) G. Don, Gen. Syst. 1 : 504, 1831.

Sida glauca Cav. Ic. 1 : 8, t. 11, 1791.

Abutilon muticum G. Don, Gen. Syst. 1 : 502, 1831 ; FBI. 1 : 327 ; Parker in Ind. For. 46 : 23, 1920.

Parker (loc. cit.) is the only authority who collected this plant from one spot on the Delhi Ridge. I have not seen it in the field.

Annual or suffrutescent. Leaves roundish-cordate, tomentose on both surfaces. Flowers large, orange. Fruits globose. Carpels about 20, awnless, shorter than the calyx.

A. ramosum Guill. & Perr. Fl. Seneg. Tent. 1 : 68, 1831 ; FBI. 1 : 328 ; FUGP. 1 : 83 ; Parker, For. Fl. 38.

A small shrub. Branches downy with thin, spreading hairs. Leaves ovate, cordate, crenate-serrate. Flowers yellow. Ripe carpels about 10, with spreading awns.

Rare.

Fruits : Feb.

J. K. Maheshwari 842, near Qutab

Malva Linn.

Flowers dark purple or violet ; corolla 3 to 4-times the length of the calyx

Flowers white ; corolla scarcely longer than the calyx *M. sylvestris*

M. sylvestris Linn. Sp. Pl. 689, 1753 ; FBI. 1 : 320. *M. parviflora*

An erect, glabrous herb. Leaves orbicular-lobed ; petioles as long or longer than the leaves. Flowers dark purple or violet, about 2.5 cm. across, on pedicels shorter than the petiole. Petals notched.

A rare weed in waste places.

Flowers and Fruits : Cold season

J. K. Maheshwari 1424

M. parviflora Linn. Amoen. Acad. 3 : 416, 1787 ; FBI. 1 : 321 ; FUGP 1 : 79.

A spreading, decumbent or nearly erect herb, up to 60 cm. tall. Leaves roundish, more or less 5 to 7-lobed. Flowers white or pinkish-tinged, small, in axillary clusters; bracteoles linear. Calyx accrescent. Petals hardly exceeding sepals. Carpels 10-12, 1-seeded. Common during the cold season, either growing by itself or in association with various weeds. The flowers wither quickly.

Flowers and Fruits : Feb.-March
J. K. Maheshwari 626

Malvastrum Gray nom. cons.

M. coromandelianum (Linn.) Garcke in Bonplandia 5 : 297, 1857 ; Merr. Enum. 3 : 33.
Malva coromandeliana Linn. Sp. Pl. 687, 1753.
Malvastrum tricuspidatum A. Gray, Pl. Wright. 1 : 16, 1852 ; FBI. 1 : 321 ; FUGP. 1 : 79.

An erect, suberect or ascending, branching, stout herb, up to 60 cm. tall, appressed-hairy. Leaves ovate to ovate-lanceolate, crenate-serrate. Flowers yellow. Bracteoles 3. Calyx lobes triangular. Carpels 8-12, reniform, with three, projecting points.

A common weed in waste places and fields. Forms a conspicuous undergrowth in fruit orchards.

Local name : Kharenti

Flowers and Fruits : Major part of the year
J. K. Maheshwari 111

Urena Linn.

U. lobata Linn. Sp. Pl. 692, 1753 ; FBI. 1 : 329 (excl. syn. *U. palmata*) : FUGP. 1 : 85 ; Parker, For. Fl. 39.
U. sinuata Linn. Sp. Pl. 692, 1753.

An erect, shrubby herb, up to 1.2 m. high. Stems and branches densely woolly. Leaves variable, 5-9 x 4-6 cm., entire or slightly lobed ; nerves prominent beneath ; 3 glands present at base of lamina. Flowers bright pink with a darker centre. Carpels armed with hooked bristles.

Common in fruit orchards and near stagnant water.

Local name : Vilayti san

Flowers and Fruits : June-Oct.

J. K. Maheshwari 114 ; 487

Pavonia Cav. nom. cons.

P. zeylanica Cav. Diss. 3 : 134, 1787 ; FBI. 1 : 331.

An erect, sticky herb, 60-150 cm. tall, branching from the base. Leaves undivided or 3-lobed, dentate. Flowers pink or rosy, erect, on

long pedicels. Bracts linear, ciliolate. Ripe carpels pale brown, unarmed, slightly winged, 3×2.5 mm.

Rather common on the Ridge in shallow depressions, under the shade of trees and also on the hilly tracts of Mehrauli. Also found along the edges of fields near the hilly tracts on loamy soil.

Flowers and Fruits : June-Nov.
J. K. Maheshwari 1070 ; 1284

Malvaviscus Dill.

M. conzattii Greenm. in Publ. Field Mus. Nat. Hist. Chicago (Bot.) 2 : 333, 1912.

A shrub. Leaves ovate, entire, crenate-serrate. Bracteoles 7 or more. Flowers red or orange-red, on axillary peduncles, opening slightly at the top. Petals erect. Staminal column exserted.

Commonly grown in hedges of gardens and near houses for its beautiful Hibiscus-like flowers.

Flowers : Major part of the year
J. K. Maheshwari 583, Nicholson Gardens ; 588

Decaschistia Wt. & Arn.

D. crotonifolia Wt. & Arn. Prodr. 52, 1834 ; Royle, Ill. 83 ; F.B.I. 1 : 332 ; FUGP. 1 : 86 ; Parker, For. Fl. 39.

Royle (loc. cit.) mentions the occurrence of this plant near Delhi. I have not seen any specimens from the district.

Leaves about 10×5 cm., ovate or slightly lobed, velvety on both surfaces with short, dense tomentum, whitish beneath. Bracteoles nearly as long as the calyx. Capsules slightly hispid. Seeds glabrous.

Hibiscus Linn.

Calyx red, fleshy, edible *H. sabdariffa*

Calyx not so :

Plants prickly :

Bracteoles with a leaf-like appendage at the apex

Bracteoles without appendages *H. surattensis*

Plants not prickly : *H. cannabinus*

Bracteoles usually absent or minute ; flowers white

Bracteoles present, free or connate : *H. lobatus*

Bracteoles connate into a cup at the base ; seeds thinly pilose

. *H. tiliaceus*

Bracteoles free and distinct :

Flowers up to 1.5 cm. across ; seeds cottony ; plants wild

Flowers larger ; seeds hairy ; plants cultivated : *H. micranthus*

Petals deeply cut, recurved

Petals not lobed or only shallowly emarginate : *H. schizopetalus*

Flowers red, scarlet ; staminal column much exserted

Flowers white, rose, purple ; staminal tube not exserted : *H. rosa-sinensis*

Flowers white, turning red ; leaves orbicular in outline, palmately lobed

Flowers rose, purple or purplish-blue ; leaves ovate from a cuneate base : *H. mutabilis*

H. syriacus

H. sabbdariffa Linn. Sp. Pl. 695, 1753 ; Duthie & Fuller, Field & Gard. Crops 3 : 30 ; Merr. Enum. 3 : 38.

An erect, glabrous shrub or small tree. Prickles absent. Stems often reddish. Lower leaves undivided ; upper palmately 3 to 5-lobed. Flowers yellow with a dark, crimson eye. Sepals united into a deep red, fleshy cup. Capsules ovoid, pointed, shorter than calyx.

Native of W. Indies. Cultivated mainly for its succulent, edible calyx.

English name : Roselle ; Red sorrel

Flowers and Fruits : Dec.-March

J. K. Maheshwari 784

H. surattensis Linn. Sp. Pl. 696, 1753 ; Royle, Ill. 83 ; FBL 1 : 334 ; FUGP. 1 : 88.

Royle (loc. cit.) is the only authority who reports this species from near Delhi.

An undershrub. Stems herbaceous, erect or subscandent, with scattered prickles. Leaves roundish, deeply palmately 3 to 5-partite. Flowers yellow with a dark centre ; bracteoles 10-12, linear, with a leaf-like appendage at the apex. Capsules ovoid, hairy. Carpels 3-awned. Seeds with stiff, yellowish hairs.

H. cannabinus Linn. Syst. 1149, 1759 ; FBL 1 : 339 ; FUGP. 1 : 90.

An erect, prickly shrub, 1.8-3 m. tall. Leaves deeply palmately lobed ; lobes distantly serrate ; petioles prickly. Flowers pale yellow with a crimson centre. Bracteoles 7-10. Sepals each with a gland at the back. Capsules globose, pointed, bristly.

Cultivated for its fibre during the rainy season. Usually grown with other crops or in hedges of cultivated fields. The fibre is used for making ropes. The bristles of the capsule are irritating.

Local name : Patsan ; San

Flowers and Fruits : Sept.-Nov.

J. K. Maheshwari 398

H. lobatus (Murr.) Kuntze, Rev. Gen. 3 : 19, 1898 ; Blatt. in JBNHS. 34 : 632, 1930.

Solandra lobata Murr. in Comm. Gotting. 6 : 24, t. 1, 1785.

Hibiscus solandra L'Hérit. Stirp. 1 : 103, t. 49, 1786 ; FBL 1 : 336.

An erect, pubescent annual, 30 cm. or more in size. Leaves ovate-cordate below, deeply 3-lobed above and linear to linear-lanceolate in the floral region, 3-6.5 x 3-6.5 cm. Flowers white. Calyx somewhat sticky. Capsules not exceeding the calyx. Seeds blackish, tubercled.

Occurs on the Ridge during the monsoon period under the shade of bushes and in ground depressions.

Local name : Faridbooti

Flowers and Fruits : Sept.-Oct.

J. K. Maheshwari 371 ; 768, Ridge

H. tiliaceus Linn. Sp. Pl. 694, 1753 ; FBL 1 : 343 ; Merr. Enum. 3 : 39.

A large shrub or small tree. Leaves roundish-ovate or nearly orbicular, somewhat abruptly acuminate, hairy beneath. Flowers yellow. Involucre tubular, deeply about 10-cleft.

Planted in gardens.

J. K. Maheshwari 1134

H. micranthus Linn. f. Suppl. 308, 310, 1781 ; FBL 1 : 335 ; FUGP. 1 : 89 ; Parker, For. Fl. 40.

An erect, shrubby plant, branching from base or often unbranched, 1-3 m. tall. Stems greenish-yellow or whitish. Leaves variable in shape. Bracteoles filiform. Flowers white fading to rosy-purple. Calyx persistent. Capsules globose.

Common in the hilly tracts in the crevices of rocks, or amongst bushes of *Capparis septaria* Linn. and other shrubs. The fruit is edible.

Local name : Okda

Flowers and Fruits : July-Oct.

J. K. Maheshwari 202

H. schizopetalus (Mast.) Hook. f. in Bot. Mag. t. 6524, 1880 ; Bailey, Man. Cult. Pl. 665 ; Bor & Raiz. 236, f. 136, Pl. 87.

H. rosa-sinensis Linn. var. *schizopetalus* Mast. in Gard. Chron. 282, 1879.

A large, glabrous shrub with drooping branches. Flowers light scarlet, red or purplish-red, pendulous on long peduncles. Petals deeply lacinate. Staminal column long-exserted.

Native of Trop. Africa. Grown in gardens for its beautiful flowers.

Flowers : Aug.-Nov.

J. K. Maheshwari 1326

H. rosa-sinensis Linn. Sp. Pl. 694, 1753 ; FBL 1 : 344 ; Bailey, loc. cit. ; Bor & Raiz. 237, f. 137, Pl. 88, 89.

An evergreen shrub, about 3 m. tall. Leaves glabrous; stipules linear. Flowers red or scarlet; bracts 7-9, linear. Staminal tube red, exceeding the corolla.

Commonly grown in gardens for its large, ornamental flowers. The flowers were used to blacken shoes, hence the English name "The Shoe Flower". Variety *rubro-plenus* Sweet is also cultivated in gardens.

Local name : Gulhar

Flowers : Feb.-Oct.

J. K. Maheshwari 134

H. mutabilis Linn. Sp. Pl. 694, 1753; FBI. 1 : 344; Bailey, Man. Cult. Pl. 666; Bor & Raiz. 234, f. 135, Pl. 86.

A large, bushy, tomentose shrub. Leaves broad ovate in outline, 3 to 5-lobed; lobes triangular, acute or acuminate, shallowly crenate-dentate. Flowers axillary, clustered at tips.

Grown in the hedges of gardens.

Flowers : Jan.

J. K. Maheshwari 1203

H. syriacus Linn. Sp. Pl. 695, 1753; FBI. 1 : 344; Bailey, loc. cit.; Bor & Raiz. 238, f. 138, Pl. 90, 91.

An erect, glabrous, bushy shrub, 120-150 cm. or more. Leaves wedge-shaped; stipules linear-lanceolate. Flowers rose or purple, often double. Bracts 10, free almost to the base.

Native of Syria. Grown in gardens for its handsome, pretty, rose-like flowers.

Local name : Gulhar

Flowers : Feb.-Oct.

Abelmoschus Medik.

A. esculentus (Linn.) Moench, Meth. 617, 1794; Merr. Enum. 3 : 40.

Hibiscus esculentus Linn. Sp. Pl. 696, 1753; FBI. 1 : 343; FUGIP. 1 : 93.

An erect, coarsely hairy herb. Leaves cordate, 3 to 5-lobed, scabrous. Flowers large, yellow with crimson centre. Capsules ribbed. Seeds round.

Cultivated during the rainy season in gardens and fields for the sake of its edible fruit, which is variously prepared as a favourite vegetable. The young pods make good pickle.

Local name : Bhendi

Flowers and Fruits : June-Oct.

J. K. Maheshwari 1325

Gossypium Linn.

Bracteoles united, not pectinate ;

Flowers yellow with purple claw

Flowers purple

Bracteoles quite free, pectinate ; leaves hirsute

*G. herbaceum**G. arboreum**G. hirsutum**G. herbaceum* Linn. Sp. Pl. 693, 1753 ; FBI. 1 : 346, in part ; FUGP. 1 : 96.

An erect, shrubby, hairy plant. Stems woody. Leaves 5 to 7-lobed, cordate at base ; stipules falcate. Flowers large, yellow with purple centre. Bracteoles 3, large, entire or toothed, cordate. Calyx beset with black, glandular dots. Capsules ovate, pointed.

Cultivated in the area as a rainy season crop, often mixed with other subsidiary crops.

Local name : Bari

Flowers and Fruits : Sept.-Oct.

J. K. Maheshwari 1423

G. arboreum Linn. Sp. Pl. 693, 1753 ; FBI. 1 : 347 ; FUGP. 1 : 95.

A shrubby, pilose plant. Leaves palmately 5 to 7-lobed, more shining above than in *G. herbaceum* Linn. Flowers purple or yellow with a crimson centre. Bracteoles united, shortly toothed. Capsules oblong-pointed.

Cultivated in the area during the monsoon period.

Flowers and Fruits : Oct.

J. K. Maheshwari, cultivated

G. hirsutum Linn. Sp. Pl. 975, 1763 ; Haines, Bot. Bih. & Or. 73 ; Merr. Enum. 3 : 43.

A coarse, much-branched bush, clothed with woolly hairs. Leaves simple to 5-lobed, thick ; lobes short, triangular ; base cordate. Flowers yellow turning to pink-purple, without a dark centre. Bracteoles quite free. Capsules spherical. Seeds with a greyish, rusty or green fuzz.

Cultivated during the rainy season.

Local name : Bari

Flowers and Fruits : Sept.-Oct.

J. K. Maheshwari, cultivated

Thespesia Soland. ex Corr. nom. cons.

T. populnea (Linn.) Soland. ex Corr. in Ann. Mus. Par. 9 : 290, 1807 ; FBI. 1 : 345 ; Blatt. & Mill. Beaut. Ind. Tr. 141, t. 31.

Hibiscus populneus Linn. Sp. Pl. 694, 1753.

A small tree. Leaves pale green, cordate, quite entire, long petiolate. Flowers yellow turning mauve. Staminal tube toothed at the top.

Found occasionally in gardens.

19. Bombacaceae

Leaflets entire ; trunk not bottle-shaped
 Leaflets dentate ; trunk bottle-shaped

Salmalia
Chorisia

Salmalia Schott & Endl.

S. malabarica (DC.) Schott & Endl. Melet. 35, 1832; Benthall, Trees Calc. 43; Santapau in RBSI, 16(1): 24, 1953; Blatt. & Mill. Beaut. Ind. Tr. 22, t. 26.

Bombax malabaricum DC. Prodr. 1: 479, 1824; FBI. 1: 349; FUGP. 1: 98.

A large, handsome, deciduous tree, forming a spreading crown. Leaflets 5-7, lanceolate, glabrous. Flowers large, bright red. Capsules woody. Seeds enveloped in copious floss.

Planted in parks, squares and gardens in New Delhi. The calyx of the flower buds is eaten as vegetable. The floss surrounding the seeds is used commonly for stuffing pillows and mattresses.

Local name : Semal ; English name : Silk-cotton tree

Flowers : Feb.-March. Fruits : April-May

J. K. Maheshwari 1447

Chorisia H. B. & K.

C. speciosa St. Hil. Pl. Us. Bras. t. 63, 1827; Bailey, Stand. Cycl. Hort. 1: 752; Bor, Man. Ind. For. Bot. 164.

An introduced, handsome tree with a striking appearance. Trunks bottle-shaped, green, covered with conical-shaped prickles. Leaflets digitate, lanceolate, dentate.

Some trees have been planted in the lawns of Prime Minister's House, New Delhi.

English name : Floss-silk tree

20. Sterculiaceae

Flowers unisexual or polygamous ; petals absent ;

Leaves cordate-ovate ; follicles woody, globose ; seeds winged

Pterygota

Leaves simple, lobed or digitate ; follicles usually coriaceous, oblong ; seeds not winged

Sterculia

Flowers bisexual ; petals present ;

Fruit of spirally twisted follicles

Helicteres

| | |
|--|---------------------|
| Fruit a capsule : | |
| Flowers on axillary, 1 to few-flowered peduncles : | <i>Pterospermum</i> |
| Trees or shrubs ; flowers white | <i>Melhania</i> |
| Shrubs ; flowers yellow | <i>Abroma</i> |
| Trees or shrubs ; flowers purplish | |
| Flowers clustered, paniced or corymbose : | |
| Trees or shrubs ; staminodes present | <i>Dombeya</i> |
| Herbs or undershrubs ; staminodes absent | <i>Melochia</i> |

Pterygota Endl.

P. alata (Roxb.) R. Br. in Benn. Pl. Jav. Rar. 234, 1844 ; Benthall, Trees

Calc. 50.

Sterculia alata Roxb. Pl. Cor. 2 : 84, t. 287, 1820 ; FBI. 1 : 360.

A large tree. Leaves large, up to 25 × 20 cm., entire, cordate-ovate, 7-nerved. Flowers in short, rusty-tomentose racemes. Follicles woody, nearly globose.

Grown as an ornamental tree in gardens.

Flowers : March-April. Fruits : June-July

J. K. Maheshwari 969

Sterculia Linn.

Inflorescence and fruits with stinging hairs *S. urens*

Inflorescence and fruits glabrous or hairy but without stinging hairs

. *S. trichosiphon*

S. urens Roxb. Pl. Cor. 1 : 25, t. 24, 1795 ; FBI. 1 : 355 ; FUGP. 1 : 100 ; Parker in Ind. For. 46 : 23, 1920.

Parker (loc. cit.) reports this plant from near Delhi and he is the only authority for the inclusion of the plant in this flora.

A moderate-sized, soft-wooded tree. Leaves crowded at the ends of the branches, cordate, large. Flowers greenish-yellow, mostly male, in terminal panicles. Stamens 15-20, united into a column. Follicles 5, woody, red when ripe. Seeds dark brown. The whole inflorescence and particularly the fruits are covered with stinging hairs.

S. trichosiphon Benth. Fl. Austral. 1 : 229, 1863 ; Parker, For. Fl. 45.

A small or medium-sized tree. Bark white. Leaves 10-20 × 10-20 cm., more or less deeply cut into 5-7, palmate lobes with acuminate tips, glabrous, crowded at the ends of branches. Racemes short. Follicles glabrous, shortly stipitate.

Planted in gardens for its graceful foliage.

Helicteres Linn.

H. Isora Linn. Sp. Pl. 963, 1753 ; FBI. 1 : 365 ; FUGP. 1 : 102 ; Parker in Ind. For. 46 : 23, 1920.

A rare plant in Delhi. Parker (loc. cit.) saw one specimen on the Ridge.
A shrub or small tree. Leaves bifarious, palmately nerved, obovate or suborbicular, irregularly serrate, rough. Flowers red turning to lead colour. Fruits characteristic. Seeds tubercled.

Pterospermum Schreb. nom. cons.

P. acerifolium Willd. Sp. Pl. 3: 729, 1800; FBI. 1: 368; FUGP. 1: 103.

A medium-sized tree with a large crown. Bark ash-coloured. Young branches and calyx covered with thick, ferruginous indumentum. Leaves large, deep cordate or peltate. Flowers fragrant. Capsules woody, 5-angled. Seeds with membranous wings.

Planted in gardens.

Local name : Mochkund : Kanakchampa
Flowers : March-July. Fruits : July-Aug.
J. K. Maheshwari 252

Melhania Forsk.

M. futeyporensis Munro ex Mast. in FBI. 1: 373, 1874; Blatt. in JBNHS. 34: 883, 1931; Parker, For. Fl. 47.

M. tomentosa Stocks ex Mast. in FBI. 1: 373, 1874; FUGP. 1: 106. Parker (loc. cit.) has united *M. tomentosa* Stocks ex Mast. with *M. futeyporensis* Munro ex Mast., because the distinction between the two is based on bracteoles alone, which, however, vary considerably and cannot, therefore, form a reliable basis for classification. Falconer (in Duthie's FUGP. 1: 106) is the only authority who collected this species from Delhi. I have not seen the plant in the field.

A coarse, pubescent or hoary-tomentose shrub. Leaves oblong, cordate, crenate-serrate. Flowers in terminal cymes, 2.5 cm. across. Capsules villous. Seeds muricate.

Abroma Jacq.

A. augusta (Linn.) Linn. f. Suppl. 341, 1781 (*Ambroma*); FBI. 1: 375; FUGP. 1: 108; Merr. Enum. 3: 48.

Theobroma augusta Linn. Syst. 233, 1767.

A large shrub or small tree. Leaves repand-denticulate. Flowers 5 cm. across, axillary. Capsules thrice as long as the persistent calyx, glabrous.

Grown occasionally in gardens.

Local name : Ulatkambal

Dombeya Cav. nom. cons.

Leaves cordate, stellate-pubescent; flowers pure white. . . *D. natalensis*

Leaves orbicular-cordate, velvety; flowers white
 Leaves cordate, velvety; flowers pink
 Leaves round-cordate, glabrescent; flowers white or reddish

D. mastersii
D. cayeuxii

D. acutangula

D. natalensis Sond. in Linnaea 23 : 17, 1850; Bailey, Man. Cult. Pl. 669.
 A shrub. Leaves acute, toothed. Flowers large, sweet-scented,
 umbellate; bracteoles narrowly awl-shaped.
 Planted in gardens.

D. mastersii Hook. f. in Bot. Mag. 93, t. 5639, 1867; Parker, For. Fl. 48.
 A shrub with spreading tops. Leaves serrate, acuminate. Flowers
 fragrant with light veins of rose, umbellate.
 Native of Trop. Africa. Grown in gardens.

Flowers : April

J. K. Maheshwari 1196

D. cayeuxii Hort. : Bailey, Man. Cult. Pl. 669.

A hybrid of *D. mastersii* Hook. f. and *D. wallichii* Jack. Flowers
 beautiful, pink, in pendulous, many-flowered umbels.
 Planted in gardens.

D. acutangula Cav. Diss. 123, t. 38, f. 2, 1787; Bailey, Stand. Cycl.
 Hort. 1 : 1065.

A shrub or small tree. Leaves crowded at the ends of branches,
 nearly glabrous. Flowers white or reddish, in cymes; bracteoles large,
 ovate. Ovary villous.

A garden shrub.

Flowers : Sept.-Oct.

J. K. Maheshwari 1201

Melochia Linn.

M. corchorifolia Linn. Sp. Pl. 675, 1753; FBI, 1 : 374; FUGP, 1 : 107.

A stout, much-branched herb or undershrub. Branches suberect or
 ascending. Leaves variable in size and shape; base 5-nerved. Flowers
 pinkish, in dense, terminal or axillary clusters, intermixed with several
 bracteoles. Capsules globose, hispid. Seeds angular.

Found near canal banks in the shade of bushes. Rather rare in the area.

Flowers and Fruits : Sept.-Oct.

J. K. Maheshwari 500

21. Tiliaceae

Trees or shrubs; fruits drupaceous

Grewia

Herbs or undershrubs :

Capsules smooth, 2 to 5-valved, elongate or subglobose . *Corchorus*
Fruits spiny, indehiscent or 3 to 6-valved, globose or oblong . *Triumfetta*

Grewia Linn.

Flowers yellow, axillary :

Stipules subulate ; drupes dry

Stipules falcate ; drupes fleshy

Flowers white, solitary, opposite the leaves

G. flavescens

G. asiatica

G. tenax

G. flavescens Juss. in Ann. Mus. Par. 4 : 91, 1804 ; Blatt. in JBNHS.

34 : 888, 1931.

G. pilosa Wt. & Arn. italior. (non Lamk.).

A shrub with light brown, stellate hairs on branchlets, petioles, leaves and inflorescences. Leaves 5-10 × 3.5-5 cm., oblong or ovate ; stipules subulate. Peduncles 3-flowered. Buds hirsute, oblong, dilated at the base. Ovaries hirsute ; stigmas 4-dentate.

Not common in the area. Some plants are found on the New Delhi Ridge. Rare on the Old Delhi Ridge.

Flowers : Oct.

J. K. Maheshwari 1163, New Delhi Ridge

G. asiatica Linn. Mant. 1 : 122, 1767 ; FBL. 1 : 386 ; FUGP. 1 : 113 ; Parker, For. Fl. 55.

A middle-sized, crooked tree with a spreading crown. Bark greyish-white. Leaves 8-20 × 8-12 cm., variable. Peduncles in fascicles of 2-8, usually 3-flowered. Drupes dark purple, more or less globose, pilose. Nuts 1-2 ; ripe pulp sweet and acidic.

An introduced tree. Grown in gardens for its edible fruits which are sold in the market during the summer months ; the pulp is made into a sherbat and used as cooling drink. The young parts are attacked by a disease and result in an aggregation of leaves.

Local name : Phalsa

Flowers and Fruits : June-July

J. K. Maheshwari 200 ; 1105 ; 1251, Kingsway Camp Police Gardens

G. tenax (Forsk.) Fiori, Bos. Piant. legn. Eritrea 246, 1909 ; F. W. Andr. Fl. Pl. Anglo. Egypt. Sud. 1 : 222.

Chadara tenax Forsk. Fl. Aegypt.-Arab. 105 & 114, 1775.

Grewia populifolia Vahl, Symb. Bot. 1 : 33, 1790 ; FBL. 1 : 385 ; FUGP. 1 : 111.

G. betulaefolia Juss. in Ann. Mus. Par. 4 : 92, 1804.

A much-branched shrub, up to 3 m. tall. Stems and branches whitish-grey to grey. Leaves irregular in shape, subcoriaceous. Flowers about 2 cm. long. Buds oblong. Drupes 2 to 4-lobed, orange-red.

Common and somewhat abundant on the Ridge, at times with sal-mentose branches, associated with *Capparis sepiaria* Linn. The fruits and seeds are eaten by men and animals.

Local name : Chabeni ; Ramchana ; Khatola ; Gondni
Flowers : July-Aug. Fruits : Oct.
J. K. Maheshwari 1158

Corchorus Linn.

Prostrate, woody herbs ; capsules cylindric *C. depressus*
Erect, annual herbs, rarely perennial :

Capsules cylindrical :

Capsules ending in a single beak, lobed at the top :

Capsules 10-ribbed, glabrous ; beak long *C. olitorius*

Capsules 3 to 4-angled, scabrous ; beak short *C. trilocularis*

Capsules ending in 3, radiating points :

Capsules 6-angled, 3-winged, short, stout *C. aestuans*

Capsules cylindric, not winged, long, slender *C. tridens*

Capsules depressed-globose *C. capsularis*

C. depressus (Linn.) Stocks in Proc. Linn. Soc. 1 : 367, 1848 ; F. W. Andr. op. cit. 217.

Antichorus depressus Linn. Mant. 64, 1767.

Corchorus antichorus Raeusch. Nom. Bot. 158, 1797 ; FBL. 1 : 398 ; FUGP. 1 : 121.

A prostrate, deep-rooted, much-branched, perennial herb. Leaves plicate. Flowers yellow. Capsules cylindric, straight or curved, 4-valved.

Found in the drier parts and hilly tracts of Gurgaon, Mehrauli and other places on sandy-clayey or gravelly soils and waste places, forming a green turf at some spots. Also seen in demolished, ancient buildings of Delhi. The plant is sold in the bazaars. It is used for the treatment of gonorrhoea and an extract is applied as a paste in healing of wounds.

Local name : Khurand ; Bohphali

Flowers and Fruits : Feb.-Aug.

J. K. Maheshwari 827

C. olitorius Linn. Sp. Pl. 529, 1753 ; FBL. 1 : 397 ; FUGP. 1 : 120.

An erect, shrubby plant. Stems very fibrous. Leaves up to 15 x 7 cm., the basal two serratures produced into filiform appendages. Peduncles 1 to 3-flowered. Flowers yellow.

Found in moist, shady places in fallow and cultivated fields.

Flowers and Fruits : Sept.-Oct.

J. K. Maheshwari 1305

C. trifocularis Linn. Mant. 77, 1767; FBI. 1: 397; FUGP. 1: 120.
A diffuse undershrub, branching from near the ground, pilose. Leaves
oblong, elliptic-oblong or ovate-oblong, shining, with or without basal
lobes. Flowers yellow. Capsules 3-6.5 x 0.3-0.4 cm., straight or curved.
Seeds black, obliquely truncate at the ends.
Common during the rainy season. Usually found in moist, shady
places and as a weed in fields.

Local name: Kowwa-toral; Kag-roti
Flowers and Fruits: Aug.-Oct.
J. K. Maheshwari 473

C. aestuans Linn. Syst. 1079, 1759 (non Forsk.); Santapau in RBSI,
16(1): 31, 1953.
C. acutangulus Lamk. Encycl. 2: 104, 1786; FBI. 1: 398; FUGP.
1: 121.

An ascending, suberect or erect, hairy annual. Leaves suborbicular
to ovate-oblong, hairy. Flowers yellow; peduncles 2 to 3-flowered.
Common in fallow and cultivated fields. Also found on the Ridge,
in waste localities and along the hedges of gardens.

Local name: Chonch
Flowers and Fruits: Aug.-Oct.
J. K. Maheshwari 349; 1274

C. tridens Linn. Mant. 566, 1771; FBI. 1: 398; FUGP. 1: 121.
A suberect or erect annual, branching from the base. Leaves lanceo-
late or linear-oblong. Flowers yellow, on leaf-apposed, 1 to 4-flowered
peduncles. Capsules 2.5-5 cm. long.

Common in cultivated fields and waste places on moist soil.

Local name: Kowwa-toral
Flowers and Fruits: Aug.-Oct.
J. K. Maheshwari 370; 1275

C. capsularis Linn. Sp. Pl. 529, 1753; FBI. 1: 397; FUGP. 1: 119.
An erect or suberect, glabrous annual. Leaves ovate-lanceolate;
the two lowest serratures produced into awns. Flowers yellow. Cap-
sules ridged and muricated.

Found along field hedges and along canal banks; used for making
ropes.

Local name: Kharenti
Flowers and Fruits: Sept.-Oct.
J. K. Maheshwari 474

Triumfetta Linn.

T. rhomboidea Jacq. Enum. Pl. Carib. 22, 1760; FBI. 1: 395; FUGP.
1: 118.

T. bartramia Linn. Syst. 1044, 1759, nom. illegit.

An erect or sarmentose, coarse herb to undershrub, much-branched from the base. Leaves variable in shape, suborbicular or broad ovate, with marginal glands near the base of lamina. Flowers yellow, in cyme clusters at the nodes. Fruits globular, clothed with smooth, hooked spines, about 5-6 mm. in diam.

Common during rainy season on the Ridge amongst shrubs under the shade of trees. Found also in cultivated fields or in waste places.

Local name : Kasni

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 1328

22. Linaceae

Linum Linn.

L. usitatissimum Linn. Sp. Pl. 277, 1753 ; FBI. 1 : 410 ; FUGP. 1 : 122.

An erect annual, 60 cm. or more tall. Leaves linear or lanceolate. Flowers blue, in a terminal, leafy panicle. Styles free. Stigmas clavate. Capsules 5-celled, spherical.

Cultivated on a very small scale during the winter season. Often found as an escape in cultivated fields, where the seeds probably come mixed with those of the cold season crops.

Local name : Alsi ; English name : Flax or linseed

Flowers and Fruits : Feb.-March

J. K. Maheshwari 1079

23. Malpighiaceae

Leaves eglandular ; calyx with a large gland

Leaves 2-glandular at base ; calyx usually glandless

Hiptage

Galphimia

Hiptage Gaertn.

H. benghalensis (Linn.) Kurz in JASB. 14 : 36, 1879 ; Santapau in RBSI. 16(1) : 34, 1953.

Banisteria benghalensis Linn. Sp. Pl. 427, 1753.

Hiptage madablota Gaertn. Fruct. 2 : 169, t. 116, 1790 ; FBI. 1 : 418 ; FUGP. 1 : 124.

An evergreen, straggling, often climbing shrub. Stems reddish-grey. Leaves ovate or elliptic-lanceolate, coriaceous. Flowers white and yellow. Samaras 3-winged ; one wing larger than the other two. Planted in gardens and public parks.

Local name : Madhavilata
 Flowers and Fruits : March-April
 J. K. Maheshwari 654, Raj Ghat

Galphimia Cav.

G. gracilis Bartl. in *Linnaea* 13 : 552, 1839 ; Niedenzu in *Pfleich.* 93 : 595 ; Bor & Raiz. 188, Pl. 69, 70.

A dwarf shrub. Leaves oblong or ovate-lanceolate, 2-5 x 1.5-2 cm. Flowers yellow, in many-flowered panicles. Native from Mexico to Panama and W. Indies. Grown occasionally in gardens.

Flowers : July

J. K. Maheshwari 247

24. Zygophyllaceae

Fruits armed

Fruits unarmed :

Leaves 1 to 3-foliolate ; stipules thorny

Leaves dissected ; stipules setaceous

Tribulus

Fagonia

Peganum

Tribulus Linn.

T. terrestris Linn. Sp. Pl. 387, 1753 ; FBI. 1 : 423 ; FUGP. 1 : 127.

A procumbent, ascending or suberect herb. Leaves paripinnate. Leaflets 12-14. Flowers yellow, pseudo-axillary. Fruits schizocarpic, breaking into 4-6 cocci, each coccus with two, sharp, divaricate spines.

It is among the commonest plants to come up after the first showers. Commonly seen in all parts during rainy season on drying up sandy soil as well as in rocky tracts. The fruits are known locally as 'Gokhru'. The seeds and fruits are powdered and used in backache.

Local name : Bhankdi ; Gokhru

Flowers and Fruits : July-Dec.

J. K. Maheshwari 25, University Grounds

Fagonia Linn.

F. cretica Linn. Sp. Pl. 386, 1753 ; FUGP. 1 : 127 ; Parker, For. Fl. 59.

F. arabica Linn. Sp. Pl. 386, 1753 ; FBI. 1 : 425.

A diffuse, branched, thorny herb or undershrub, up to 60 cm. tall. Nodes swollen. Branches glandular. Leaves 1 to 3-foliolate. Leaflets linear or elliptic. Stipular spines 3-4 at each node. Flowers pink or sometimes whitish. Nutlets 1-seeded. Seeds brown.

Found on hilly tracts of Delhi on dry, yellowish-brown, sandy-loam soil. The plant has recently become naturalized on the Old Delhi Ridge along the slope of the Water Reservoir near the University. It has also been collected near Mehrauli, where the local people use the extract for spermatorrhoea. The ash is given to children suffering from anaemia.

Local name : Dhuansa
Flowers and Fruits : July-Oct.
J. K. Maheshwari 310

Peganum Linn.

P. harmala Linn. Sp. Pl. 444, 1753 ; FBI. 1 : 486 ; FUGP. 1 : 128.

A pretty, bush-like, glabrous herb. Leaves 4-7 cm. long, dissected into linear segments. Flowers white, 2 cm. or more across. Capsules globose, depressed at the top. Seeds angled, flat.

Rather rare, in dry, rocky areas. Not seen on the Delhi Ridge, but collected from Anand Parbat (in Karol Bagh), a small hillock characterized by sparse vegetation and dominated by *Adhatoda vasica* Nees. The presence of this plant is said to indicate accumulation of potassium nitrate in the soil.

Local name : Harmal
Flowers and Fruits : Aug.
J. K. Maheshwari 1211 ; 1278, Shakti Nagar

25. Oxalidaceae

Trees ; fruit a berry *Averrhoa*
Herbs ; fruit a capsule *Oxalis*

Averrhoa Linn.

A. carambola Linn. Sp. Pl. 428, 1753 ; FBI. 1 : 439 ; FUGP. 1 : 132 ; Merr. Enum. 2 : 324.

A medium-sized tree. Leaves imparipinnate. Flowers pinkish or purplish. Fruits yellow, ovoid or ellipsoid, acutely angled, 13 × 7 cm. Seeds arillate.

Common in the Sabzimandi and Sarai Rohilla fruit orchards. Cultivated for its fruit, which is eaten raw, cooked or pickled. Two varieties occur in the area : one with sweet and the other with acidic fruits. The flowers are borne in axillary cymes and also on the main trunk and branches (Cauliflory).

Local name : Kamrakh
Flowers : Summer and rainy seasons. Fruits : Cold season
J. K. Maheshwari 135, Sarai Rohilla Gardens

Oxalis Linn.

Flowers yellow ; leaflets obcordate

Flowers bluish-purple or purple-violet :

Leaflets 3, obcordate, roundish at the sides

Leaflets 3, broadly and distinctly triangular

O. corniculata

O. martiana

O. latifolia

O. corniculata Linn. Sp. Pl. 435, 1753 ; FBI. 1 : 436 ; FUGP. 1 : 130 ;
Calder in RBSI. 6(8) : 331, t. 5, 1919.

A slender, pubescent herb with long, creeping or subterranean stems and ascending shoots. Leaflets broader than long. Capsules 2 cm. or more long, subcylindric, angular. Seeds deep brown, rugose. Common in cultivated and fallow fields, gardens and waste localities, having a preference for moist, shaded places. The leaves possess an agreeable sour taste and are eaten.

Local name : Champa-methi ; Khat-mitthi ; Teeapatiya ; Khatta-mitha ; Nonki

Flowers and Fruits : Nov.-June

J. K. Maheshwari 116

O. martiana Zucc. in Denksh. Akad. Muench. 9 : 144, n. 6, 1823-24 & in Abh. Akad. Muench. 1 : 203, 1829-1830 ; Kunth in Pfreich. 4 : 130.

O. corymbosa DC. Prodr. 1 : 696, 1824.

A stemless, pubescent perennial. Leaves radical. Leaflets broadly obcordate, divided at the tip. Peduncles axillary, radical. Flowers pale rose, veined with purple, in cymes. Ovaries angular ; styles 5.

Naturalized in moist, shaded places in gardens, fruit orchards and nurseries. Seen frequently on the floor of green-houses and in pots, along with the winter ornamentals.

Local name : Khat-mitthi

Flowers : Nov.-April

J. K. Maheshwari 1035 ; 1222, Roshanara Gardens

O. latifolia H. B. & K. Nov. Gen. & Sp. 5 : 237, t. 467, 1821 ; Calder, op. cit. 335, t. 8 ; Kunth in Pfreich. 95 : 273.

It resembles the preceding species except in the leaflets. Leaflets with divergent, more or less oval leaves ; apices broad, not rounded, tapering towards the ends.

Native of Mexico ; now naturalized in moist, shaded places in gardens, nursery beds and nursery pots.

Local name : Khat-mitthi ; Khat-mandari

Flowers : Dec.-June

J. K. Maheshwari 77, Roshanara Gardens

26. Rutaceae

| | |
|--|-----------------|
| Armed shrubs or trees : | <i>Citrus</i> |
| Leaves unifoliate ; pericarp leathery | |
| Leaves multifoliate ; pericarp woody : | <i>Aegle</i> |
| Leaflets 3 ; stamens numerous | <i>Feronia</i> |
| Leaflets more than 3 ; rachis winged ; stamens 10-12 | |
| Unarmed shrubs or trees : | <i>Clausena</i> |
| Anther filaments dilated below ; style short | <i>Murraya</i> |
| Anther filaments not dilated below ; style long | |

Citrus Linn.

Petioles mostly broadly winged ; fruits large-sized, normally over 12 cm. broad *C. maxima*

Petioles naked or with wings seldom more than 1 cm. wide ; fruits medium or small-sized, rarely more than 12 cm. broad :

Young shoots usually purplish ; petals more or less pink or purplish outside ; rind of fruits thick and soft :

Leaves highly scented ; petiole short, not winged ; fruits usually less than 10 cm. long, egg-shaped, with a blunt apical projection. The Lemon *C. limon*

Leaves not highly scented ; petioles sometimes with a broad wing ; fruits large, variable ; rind very fragrant.

The Citron *C. medica*

Young shoots green or greenish-white ; petals pure white ; rind of fruits thin :

Peel orange or scarlet-orange, bright ; fruits rarely longer than broad *C. aurantium*

Peel green or yellow when ripe ; fruits often longer than broad :

Pulp of fruit very acid, aromatic. The Sour Lime

C. aurantifolia

Pulp of fruit sweet, not aromatic. The Sweet Lime

C. limettioides

C. maxima (Burm.) Merr. Interpret. Herb. Amb. 296, 1917 & Sp. Blancoanae 204.

Aurantium maximum Burm. Auct. Herb. Amb. 16, 1755.

Citrus grandis Osbeck, Dagbok Ostind. Res. 98, 1757.

C. decumana Linn. Syst. 508, 1774 ; FBI. 1 : 516 ; FUGP. 1 : 142.

Tree or large shrub. Twigs pubescent. Leaves large, ovate-oblong, often emarginate ; petioles broadly winged. Flowers white. Fruits globose or pear-shaped ; rind thick.

Cultivated in gardens.

Local name : Chakotra

J. K. Maheshwari 1439

C. limon (Linn.) Burm. f. Fl. Ind. 173, 1768 ; Webber & Batchelor, Citrus Ind. 1 : 398.

C. medica Linn. var. *limon* Linn. Sp. Pl. 2 : 782, 1753.

A small, thorny tree. Young foliage and flower buds pinkish. Leaves ovate ; petioles marginate or winged. Fruits medium-sized, ovoid, yellow ; rind thin.

Cultivated in gardens for its lemons.

English name : Lemon

C. medica Linn. Sp. Pl. 782, 1753 ; FBI. 1 : 514 ; FUGP. 1 : 140 ; Webber & Batchelor, op. cit. 396.

A shrub or small tree. Young parts glabrous. Leaves oblong ; petioles naked or marginate. Flowers white above, pinkish or purplish below. Fruits large, oblong or obovoid, yellow ; rind thick.

Cultivated.

English name : Citron

Flowers and Fruits : Greater part of the year

C. aurantium Linn. Sp. Pl. 783, 1753 ; FBI. 1 : 515 ; FUGP. 1 : 141 ; Parker, For. Fl. 63 ; Webber & Batchelor, op. cit. 402.

Shrub or small tree. Young shoots glabrous. Leaves elliptic or ovate. Flowers white. Fruits globose, slightly flattened at ends. Pulp acid.

Cultivated in gardens and nurseries for its useful fruit. The races commonly grown in the district are : (1) Santara, (2) Kokni, (3) Malta, and (4) Mandarin.

C. aurantifolia (Christm.) Swingle in Jour. Wash. Acad. Sci. 3 : 465, 1913 ; Webber & Batchelor, op. cit. 401.

Limon aurantifolia Christm. in Linn. Pflanzensyst. 1 : 618, 1777.

A shrub or small tree. Leaves elliptic-oblong or ovate ; petioles winged. Flowers white. Fruits usually small, globose or ovoid, yellow or green when ripe, smooth ; rind thin, tightly attached ; pulp acidic.

Cultivated.

Local name : Nimbu ; Kaghzi-nimbu

C. limettloldes Tanaka in JIBS. 16 : 236, 1937.

A shrub. Petioles winged. Flowers small, pure white. Fruits globose or ovoid, smooth, thin-skinned, pale yellow ; pulp sweet.

Cultivated. It is much used as a stock on which to graft loose-skinned oranges.

Local name : Mitha-nimbu (Mith of Lahore)

Fruits : Summer and rainy seasons

Aegle Correa nom. cons.

A. marmelos (Linn.) Correa in TLS. 5 : 223, 1800 ; FBI. 1 : 516 ;

FUGP. 1 : 143 ; Parker, For. Fl. 62.

Crataeva marmelos Linn. Sp. Pl. 444, 1753.

A small or medium-sized, deciduous tree. Bark grey-white with longitudinal wrinkles. Branches ascending. Spines 2-4 cm. long, reddish-brown. Leaves glabrous. Flowers greenish-white. Fruits large, globose ; pulp sweet.

Cultivated in gardens. The tree is held sacred by the local people. The fruits are used medicinally.

Local name : Bel ; Belpatra ; Shreephal
Flowers : March-May. Fruits : April-Aug.
J. K. Maheshwari 1137

Feronia Correa

F. limonia (Linn.) Swingle in Jour. Wash. Acad. Sci. 4 : 328, 1914 ; Webber & Batchelor, op. cit. 466.

Schinus limonia Linn. Sp. Pl. 389, 1753.

Feronia elephantum Correa in TLS. 5 : 225, 1800 ; FBI. 1 : 516 ; FUGP. 1 : 143.

A small- to medium-sized tree. Bark brown-grey. Thorns 2-3 x 0.1-0.15 cm. long. Branches spreading horizontally. Leaves 3 to 7-foliolate, sweet-smelling ; petioles and rachides often winged. Flowers pale green. Anthers dark red. Fruits large, globose ; rind woody.

Found in a semi-wild state on the Ridge ; it has been planted near Chauburjha and Rajpur Roads in Old Delhi. Seen occasionally in gardens.

Local name : Kaith
Flowers : March-May. Fruits : Oct.
J. K. Maheshwari 1032, Old Delhi Ridge ; 1141

Clausena Burm. f.

C. lansium (Lour.) Skeels in U.S. Dept. Agric. Bur. Pl. Ind. Bull. 168 : 31, 1909 ; Merr. Enum. 2 : 337.

Quinaria lansium Lour. Fl. Cochinch. 272, 1790.

Clausena wampi Blanco, Fl. Filip. 358, 1837 ; FBI. 1 : 505.

C. wampi Oliv. in JLS. 5, Suppl. 2 : 34, 1861.

An unarmed, small tree. Leaves and inflorescences pustular. Leaves imparipinnate. Leaflets ovate or elliptic. Flowers white, in compound panicles. Fruits small, orange-flavoured.

Occasionally cultivated in gardens for its fruit.

Local name : Ampich
Flowers : March-April. Fruits : May-June
J. K. Maheshwari 634, University Campus

Murraya

Leaves aromatic

Leaves not

M. koenigii

1 : 137

Berger

A large

1.6-2.5 cm

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Murraya Linn. corr. Murr. nom. cons.

Leaves aromatic ; leaflets pubescent ; berries black

Leaves not aromatic ; leaflets glabrous ; berries red

M. koenigii (Linn.) Spreng. Syst. 2 : 315, 1825 ; FBI. 1 : 503 ; FUGP. 1 : 137 ; Parker, For. Fl. 66.

Bergera koenigii Linn. Mant. 563, 1771.

A large, deciduous shrub or small tree. Bark grey. Leaves 2-5.5 x 1.6-2.5 cm., pale green. Flowers white, in terminal, corymbose umbels. Young berries shining, pale yellow, later turning black. Cultivated in gardens for the leaves which are much used in flavouring curries.

Local name : Mitha-neem

Flowers and Fruits : Summer season

J. K. Maheshwari 1145 ; 1170 ; 1335

M. paniculata (Linn.) Jack in Mal. Misc. 1(5) : 31, 1820 ; Santapau in RBST. 16(1) : 39, 1953.

Chalcas paniculata Linn. Mant. 68, 1767.

Murraya exotica Linn. Mant. 563, 1771 (*Murraea*) ; FBI. 1 : 502 ; FUGP. 1 : 137.

An evergreen, attractive, small tree or large shrub. Bark ash-coloured. Leaflets 3-9, shining. Flowers white, fragrant, in short corymbs. Berries ovoid, bright red or orange-coloured.

Grown in gardens for its ornamental appearance and also planted as a hedge plant.

Local name : Kamini

Flowers : Summer and rainy seasons. Fruits : Cold season

J. K. Maheshwari 633 ; 690

27. Simaroubaceae

Large trees ; leaves pinnate ; fruit a samara *Ailanthus*

Small, spiny trees ; leaves 2-foliolate ; fruit a drupe *Balanites*

Ailanthus Desf. nom. cons.

A. excelsa Roxb. Pl. Cor. 1 : t. 23, 1795 ; FBI. 1 : 518 ; FUGP. 1 : 144 ; Parker, For. Fl. 68.

A large, beautiful tree. Wood soft, white. Leaves imparipinnate. Flowers pendulous, greenish-yellow, ill-smelling, in large panicles. Samaras copper red, once or twice twisted at the base.

It thrives well and has been planted along several roads of New Delhi. The leaves are boiled and their extract is used for washing wounds and skin eruptions.

Local name : Ulloo ; Urru
 Flowers : Jan-March. Fruits : May-July
 J. K. Maheshwari 788 ; 1336

Balanites Delile non. cons.

B. roxburghii Planch. in Ann. Sc. Nat. (ser. 4) 4 : 258, 1854 ; FBI. 1 : 522 ; Parker, For. Fl. 68.

A middle-sized tree or a bush. Stems pale brown or whitish. Branches ascending or horizontal. Branchlets ending in sharp, straight thorns. Flowers white or greenish-white, fragrant, in close cymes. Fruits woody, more or less ovoid in shape ; pulp bitter.

Common on New Delhi Ridge. Abundant behind Willingdon Crescent in New Delhi and on the hilly tracts near Faridabad. The tree propagates by root suckers and hence is often found growing gregariously.

The fruits are sold in the market and have several uses. The pulp is used in whooping cough. The woody endocarp is filled with gunpowder and used in fire-works. The wood is used by cobblers to sharpen their implements. The fruits are used for washing clothes and also made into garlands for cows and other animals.

Local name : Hingot ; Hingota
 Flowers : April-May. Fruits : June-Sept.
 J. K. Maheshwari 1072, Kitchener Road

28. Ochnaceae

Ochna Linn.

O. quinaria Linn. Sp. Pl. 732, 1762 ; FBI. 1 : 523.

A large shrub. Bark smooth, brown. Leaves elliptic or elliptic-lanceolate, parallel-nerved. Flowers yellow, about 2.5 cm. across, fragrant, in corymbose racemes. Drupes black.

Grown in lawns of public gardens for its handsome appearance and fragrant flowers.

Flowers : April
 J. K. Maheshwari 1005, Lodi Gardens

29. Burseraceae

Boswellia Roxb.

B. serrata Roxb. ex Colebr. in As. Res. 9 : 379, t. 5, 1807 ; FBI. 1 : 528 ; FUGP. 1 : 147 ; Parker, For. Fl. 69.

Parker (Ind. For. 46 : 24, 1920) reports this plant from near Delhi and believes that at one time it undoubtedly occurred on the Ridge. I have not seen the plant in the field.

A moderate-sized, deciduous tree with a spreading, flat crown. Leaves crowded near the ends of the branches. Leaflets many, variable. Flowers white. Drupes trigonous.

Local name : Salai ; Salhe ; Gunj
Flowers : April-May. Fruits : July-Aug.

30. Meliaceae

Fruit a small, indehiscent drupe :

Leaves once pinnate ; ovary 3-celled

Leaves bipinnate ; ovary 5-celled

Azadirachta

Fruit a capsule :

Melia

Stamens free

Toona

Stamens united into tube :

Disk annular ; seeds winged at the upper end

Swietenia

Disk 0 ; seeds winged only below

Chukrasia

Azadirachta A. Juss.

A. indica A. Juss. in Mém. Mus. Par. 19 : 221, 1830 ; Parker, For. Fl. 71 ; Gamble, Fl. Pres. Mad. 177.

Melia azadirachta Linn. Sp. Pl. 385, 1753 ; FBI. 1 : 544 ; FUGP 1 : 150.

A large tree. Leaves 20-30 cm. long, crowded near the ends of the branches, pinnate. Leaflets 10-12, 7×2.5 cm., serrate. Flowers white, scented. Anthers 10. Ovary 3-celled. Drupes ovoid-oblong, smooth, yellow when ripe.

A common roadside tree. Self-sown young plants are frequently seen on the Ridge. The bark, leaves, flowers, seeds and the oil they yield are used for food as well as for medicine.

Local name : Nim ; Neem

Flowers : March-May. Fruits : May-July

J. K. Maheshwari 666

Melia Linn.

M. azedarach Linn. Sp. Pl. 384, 1753 ; FBI. 1 : 544 ; FUGP. 1 : 151 ; Parker, For. Fl. 72 ; Merr. Enum. 2 : 360.

A medium-sized tree, up to 12 m. high. Leaves bipinnate. Leaflets $2.5-7.5 \times 1.5-2$ cm., serrate. Flowers lilac-blue. Ovary 5-celled. Drupes globose, more or less dry, yellow and wrinkled at maturity.

Planted along roadsides and in the squares and gardens of New Delhi. The tree deserves a place in avenues and in the gardens near the ancient monuments of Delhi and New Delhi ; it is referred to as the "Pride of India" and in English it is known as the "Persian Lilac".

Local name : Bakain
Flowers : March-May. Fruits : May-July
J. K. Maheshwari 627

Toona Roem.

T. elliptica Roem. Syn. Hesp. 139, 1846 ; Santapan in RBSI, 16 (1) : 45, 1953.

Cedrela toona Roxb. ex Rottl. & Willd. in Ges. Naturf. Fr. Neue Schr. 2 : 198, 1803 ; FBF. 1 : 568.

A handsome, large, deciduous tree, branching high above the ground, erect or bent. Bark dull black. Leaves paripinnate. Leaflets entire or undulate, often oblique at the base. Flowers white, scented, in short, terminal panicles. Capsules oblong, smooth.

Some trees have been planted along Hasting's, Akbar, Queen Victoria and Asoka Roads as well as in fruit orchards. Young plants are found along the banks of irrigation canals in fruit gardens. The wood is used in making drums.

Local name : Toon
Flowers and Fruits : Summer season
J. K. Maheshwari 1381

Swietenia Jacq.

S. mahagoni Jacq. Enum. Pl. Carib. 20, 1760 ; Gamble. Fl. Pres. Mad. 187.

An evergreen tree. Leaves paripinnate. Leaflets obliquely ovate or lanceolate, entire, glabrous. Flowers greenish-yellow, in axillary panicles.

Planted in parks.

Local name : Mahogany

Chukrasia A. Juss.

C. tabularis A. Juss. in Mém. Mus. Par. 19 : 251, t. 22, f. 27, 1830 ; Brandis, Ind. Tr. 144.

A large, beautiful tree with reddish-brown bark. Leaves pinnate. Leaflets alternate to subopposite, 10-13 x 4.5-5.5 cm.; upper surface glabrous and shining, lower pale yellow and pubescent, but not velvety.

Although a native of India, according to the 'Malis' of Delhi, it has not so far been observed to flower in this area. Planted along roadsides, in public gardens, lawns and squares. Produces a dense, shady crown of foliage.

Local name : Chikrasi
J. K. Maheshwari 745, Lodi Gardens

Maytenus H.

M. senegale

Cufodor

Celastru

Gymnos

G. spine

Rolle

An ere

branches

Leaves 2-5

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31. Celastraceae

Maytenus H. B. & K. nom. cons.

M. senegalensis (Lamk.) Exell in Bot. Soc. Brot. (ser. 2) 26 : 227, 1952 ;
Cufodontis in Bull. Jard. Bot. Brux. Suppl. 28 : 479, 1958.

Celastrus senegalensis Lamk. Encycl. 1 : 661, 1785.

Gymnosporia montana Benth. Fl. Austral. 1 : 400, 1863.

G. spinosa Fiori, Bos. Piant. legn. Eritrea 225, 1909, non Merr. &
Rolfe (1908) nec Christensen (1922).

An erect, scandent or straggling shrub. Stems white-grey. Young
branches reddish-brown and ending in leaf- and flower-bearing thorns.
Leaves 2-5 in axillary clusters, variable in form and size. Flowers small,
white, in cymes. Capsules globose or ovoid, black.

Common on the Ridge ; either associated with *Capparis septaria*
Linn., *Grewia tenax* Fiori and other shrubs, or straggling amongst trees.

Local name : Kakera

Flowers : June-Oct. Fruits : Feb.-April

J. K. Maheshwari 463, Ridge

32. Rhamnaceae

Zizyphus Mill.

Trees ; drupes 1.5-2 cm. or longer

Small bushes ; drupes globose, 1-1.5 cm. long

Straggling or climbing shrubs ; drupes 7 mm. long

Z. mauritiana

Z. nummularia

Z. oenoplia

Z. mauritiana Lamk.* Encycl. 3 : 319, 1789 ; Santapau in JBNHS.

51 : 802, 1953.

Z. jujuba Lamk. Encycl. 3 : 318, 1789 (non Mill. 1768) ; FBL 1 : 632 ;
FUGP. 1 : 163.

An erect tree with a spreading crown. Bark rough, grey or dull
black. Prickles solitary or paired. Leaves variable, yellowish-green,
oblong-elliptic. Flowers greenish-yellow. Drupes oblong-globose or
ovoid, red, orange or yellowish.

Occurs in a wild state near Qutab and other parts in the district.
Commonly cultivated for its fruit in the Sabzimandi and Sarai Rohilla
fruit orchards. The shape and size of the leaves as well as fruits vary
considerably ; they are small in the wild plants and larger in the culti-
vated races. The common races cultivated in the area are : Gularbasi,
Dandan, Gola, Sev, Khatti and Zafran.

*This species has been referred so far as *Z. jujuba* Lamk. It should be called
Z. mauritiana Lamk. (Santapau, loc. cit.). The name *Z. jujuba* Lamk. (1789) is
preoccupied by Miller's name of 1768 and Lamarck's name is therefore illegitimate,
being a later homonym in the sense of Art. 64 of Montreal Code (1961).

Local name : Pendi-ber (cultivated plants) : Ber

Flowers : Sept.-Nov. Fruits : Cold season

J. K. Maheshwari 488, Kingsway Camp Gardens ; 841, Qutab

Z. nummularia (Burm. f.) Wt. & Arn. Prodr. 162, 1834 ; FBI. 1 : 633 ;

Parker, For. Fl. 84.

Rhamnus nummularia Burm. f. Pl. Ind. 61, 1768.

Zizyphus rotundifolia Lamk. Encycl. 3 : 319, 1789 ; FUGP. 1 : 164.

A thorny, small bush or shrub. Stems and branches pale purplish, velvety. Stipular prickles in pairs. Leaves ovate to orbicular, densely tomentose beneath. Flowers pale yellow, in axillary cymes. Drupes red or black.

Gregarious on the Ridge and in the plains on waste ground. The leaves are used as fodder for camels, sheep and goats. Shepherd boys eat the fruits.

Local name : Kokanber : Badber : Jhud : Beri

Flowers : June-Sept. Fruits : Cold season

J. K. Maheshwari 456, Ridge

Z. oenoplia Mill. Gard. Dict. n. 3, 1768 ; FBI. 1 : 634 ; FUGP. 1 : 164.

Rhamnus oenoplia Linn. Sp. Pl. 194, 1753.

A straggling or climbing shrub. Prickles paired, one straight, the other recurved. Leaves ovate, pointed ; base oblique. Flowers in short, axillary, dichotomous cymes. Drupes globose or obovoid, black, shining.

A rare plant in the district.

Flowers : April-May. Fruits : Rainy season

J. K. Maheshwari 1450, near Suraj Kund

33. Vitaceae

Leaves trifoliate ; flowers hermaphrodite ; petals 4

Leaves simple ; flowers polygamo-dioecious ; petals 5

Cayratia

Vitis

Cayratia Juss. nom. cons.

C. carnos Gagnep. in Not. Syst. 1 : 347, 1911 ; Gamble, Fl. Pres. Mad. 237.

Vitis carnos Wall. Cat. 6018, 1831-32, nom. nud. ; Wt. & Arn. Prodr. 127, 1834.

V. trifolia Linn. Sp. Pl. 203, 1753 ; FUGP. 1 : 174.

A creeping or twining shrub. Leaves trifoliate. Leaflets variable, crenate-serrate. Tendrils branched. Flowers greenish-white, in umbellate cymes. Berries globose, black, 2- to 4-seeded.

Common in the Sabzimandi and Sarai Rohilla Gardens, where it is

found creeping on moist soil, spreading on dead, thorny bushes or twining upon the fruit trees. Also occurs on the Ridge and in the neighbouring hilly tracts.

Flowers : Rainy season. Fruits : Rainy and winter seasons
J. K. Maheshwari 127

Vitis Linn.

V. vinifera Linn. Sp. Pl. 202, 1753 ; FBI. 1 : 652 ; FUGP. 1 : 171.
A woody climber with bifid tendrils. Leaves thin, suborbicular, more or less deeply 3 to 5-lobed, acutely toothed ; basal sinus deep. Occasionally cultivated in the fruit orchards of Sabzimandi and Sarai Rohilla.

Local name : Angur ; English name : Grape
J. K. Maheshwari 1419, Gulab Bagh Nursery

34. Sapindaceae

Climbing herbs ; flowers petalous *Cardiospermum*
Erect shrubs or trees ; flowers apetalous ;
Evergreen shrubs ; leaves simple *Dodonaea*
Trees ; leaves compound ;
Calyx 4 to 6-lobed ; ovary glabrous ; fruits smooth or prickly
Calyx nearly truncate or shallowly toothed ; ovary pubescent,
often verrucose ; fruits tubercled *Litchi*

Cardiospermum Linn.

C. halicacabum Linn. Sp. Pl. 366, 1753 ; FBI. 1 : 670 ; FUGP. 1 : 178 ;
Merr. Enum. 2 : 493.

An erect herb or climbing by tendrils. Leaves bipinnate. Leaflets pinnately lobed. Flowers white. Capsules trigonous, bladder-like, winged at the three angles. Seeds black.

Common during the monsoon period on the Ridge and the neighbouring hilly tracts, often climbing on shrubs and trees in shady places or depressions.

Flowers and Fruits : Aug.-Oct.
J. K. Maheshwari 276

Dodonaea Linn.

D. viscosa (Linn.) Jacq. Enum. Pl. Carib. 19, 1760 ; FBI. 1 : 697 ; FUGP. 1 : 182.

Pilea viscosa Linn. Sp. Pl. 118, 1753.
An evergreen shrub or a small tree, often a climber. Leaves shining.
Flowers greenish-yellow. Capsules thin, winged, yellowish-brown. Seeds
black.

A common hedge plant.

Local name : Vilayti mehndi

Flowers : Aug.-Feb. Fruits : Feb.-March

J. K. Maheshwari 965

Schleichera Willd. nom. cons.

S. oleosa (Lour.) Oken, Allg. Naturgesch. (3) 2 : 1341, 1841; Santapau
in RBSI. 16(1) : 57, 1953; Bor, Man. Ind. For. Bot. 260.

Pistacia oleosa Lour. Fl. Cochinch. 2 : 615, 1790.

Schleichera trijuga Willd. Sp. Pl. 4 (2) : 1396, 1806; FBL. 1 : 681;
FUGP. 1 : 179.

A handsome tree. Leaves paripinnate. Flowers yellowish-green.
Fruits pointed, smooth or echinate.

Planted in gardens. It is distinguishable by its bright red young
foliage which appears in April. The subacidic arils are eaten. The oil
from the seeds is used in perfumery.

Local name : Kusum

Flowers and Fruits : Summer season

J. K. Maheshwari 1431

Litchi Sonner.

L. chinensis Sonner. Voy. Ind. 3 : 255, 1782; Benthall, Trees Calc. 124.

Nephelium litchi Camb. in Mém. Mus. Par. 18 : 30, 1829.

Dinocarpus litchi Lour. Fl. Cochinch. 233, 1790.

A small tree. Leaves paripinnate. Leaflets 4-12, opposite or alter-
nate, oblong-lanceolate or ovate, glabrous. Flowers minute, in terminal
panicles. Fruits red or pink when ripe; pericarp brittle, tubercled.
Seed 1; aril large, fleshy.

Cultivated in gardens for its very delicious fruits.

Local name : Lichi

Flowers and Fruits : April-June

J. K. Maheshwari 1416

35. Anacardiaceae

Leaves simple; ovary 1-celled; style lateral

Leaves compound :

Leaves imparipinnate :

Ovary 5-celled

Mangifera

Spondias

Ovary 1-celled
Leaves trifoliolate

Schinus
Rhus

Mangifera Linn.

M. indica Linn. Sp. Pl. 200, 1753; FBI. 2: 13; FUGP. 1: 189; Parker, For. Fl. 115; Merr. Enum. 2: 468.

A large, evergreen tree with a dense crown. Leaves crowded at the end of branches. Flowers yellowish-green, in terminal panicles, polygamous. Drupes 10-15 x 6-9 cm., ovoid, greenish, yellowish or reddish. Several varieties, differing mainly in the quality of the fruit, are cultivated in the Sabzimandi and Sarai Rohilla fruit orchards. It has been planted as an avenue tree on the Akbar and Aurangzeb Roads. A disease, the cause of which is unknown but is said to be a virus, produces abnormal inflorescences in which the flowers seldom set fruit.

Local name : Am ; English name : Mango
Flowers : March-April. Fruits : June-July
J. K. Maheshwari 1415

Spondias Linn.

S. pinnata (Linn. f.) Kurz, Pegu Rep. A. 44, 1875; Merr. Enum. 2: 470; Bor, Man. Ind. For. Bot. 267.

Mangifera pinnata Linn. f. Suppl. 156, 1781.

Spondias mangifera Willd. Sp. Pl. 2: 751, 1799; FBI. 2: 42; FUGP. 1: 190.

A medium-sized tree, branching above. Trunk about 30 cm. in girth. Bark white-grey. Leaflets 9-13, elliptic-oblong. Flowers greenish-white, polygamous, in panicles. Drupes fleshy, yellow, 5 x 3.5 cm.

Cultivated in gardens for its acidic fruit which is eaten as pickle. The tree is leafless from December to April when flowers and new foliage appear.

Local name : Amra
Flowers : May. Fruits : June
J. K. Maheshwari 120, 21-Bigah Bagh (Azadpur)

Schinus Linn.

S. terebinthifolius Raddi in Mem. Mod. 18, Fis. 399, 1820; Parker, For. Fl. 119; Bailey, Man. Cult. Pl. 627.

An evergreen shrub. Leaflets 7-11, 3-7 x 1.5-2.5 cm., elliptic-oblong to elliptic-lanceolate, dark green above, pale beneath. Flowers small, white, in axillary and terminal panicles. Stamens 10. Drupes globose, small, bright green.

Native of Brazil. Grown in the hedges in public gardens and around bungalows for its ornamental appearance.

Flowers : Oct.-Dec. Fruits : Cold season
J. K. Maheshwari 862, Nicholson Gardens

Rhus Linn.

R. mysorensis Heyne ex Wt. & Arn. Prodr. 172, 1834 ; FBI. 2 : 9 ;
FUGP. 1 : 186 ; Parker. For. Fl. 113.

A thorny shrub. Leaflets 3, sinuate-toothed, obovate or cuneate.
Flowers minute, yellowish, unisexual, in axillary and terminal panicles.
Drupes small, dry, compressed.

Not common. Some shrubs occur in the Reserved Forest area of
New Delhi Ridge. The sour fruits are eaten.

Local name : Dansura

Flowers and Fruits : Sept.

J. K. Maheshwari 1051, New Delhi Ridge

36. Moringaceae

Moringa Adans.

M. oleifera Lamk. Encycl. 1 : 398, 1785 ; Benthall, Trees Calc. 137.

Guilandina moringa Linn. Sp. Pl. 381, 1753.

Moringa pterygosperma Gaertn. Fruct. 2 : 314, 1791 ; FBI. 2 : 45 ;

FUGP. 1 : 192.

A small or large tree. Trunk grey-white with longitudinal wrinkles.
Leaves polypinnate. Leaflets obovate or elliptic. Flowers pale white,
fragrant. Pods long, pendulous.

Cultivated in private and public gardens, and urban areas of the dis-
trict. The green pods are used as vegetable.

Local name : Sonjna

Flowers : Feb.-April. Fruits : April-June

J. K. Maheshwari 1218

37. Papilionaceae (Fabaceae)

Tribe 1. *Genisteae*. Leaves simple or digitately 3-foliolate ; stamens
monadelphous.

Anthers unequal ; pods turgid, thick ;

Prostrate herbs

Erect herbs, undershrubs or shrubs

1. *Heylandia*

2. *Crotalaria*

Tribe 2. *Trifolieae*. Leaves pinnately or digitately 3-foliolate ; leaflets
toothed ; stamens diadelphous.

Leaves digitately 3-foliolate

Leaves pinnately 3-foliolate ;

3. *Trifolium*

Pods spirally twisted
 Pods straight or recurved
 Pods short, round or oblong

4. *Medicago*
 5. *Trigonella*
 6. *Melilotus*

Tribe 3. *Galegeae*. Leaves imparipinnate, rarely simple; stamens usually diadelphous.

Anthers apiculate or gland-tipped, hairs centrally attached;
 Stamens monadelphous
 Stamens diadelphous

Anthers muticous, hairs basifixed;
 Pods 1-seeded; leaves gland-dotted

7. *Cyamopsis*
 8. *Indigofera*

Pods few or many-seeded;
 Flowers in axillary racemes; pods long

9. *Psoralea*

Flowers in terminal, leaf-opposed or paniculate racemes;
 Herbs or undershrubs; stamens diadelphous

10. *Sesbania*

Trees; stamens monadelphous

11. *Tephrosia*
 12. *Millettia*

Tribe 4. *Hedysareae*. Leaves imparipinnate or uni- to 3-foliolate; stamens diadelphous; pods jointed or constricted.

Fruits aerial:

Leaves bifoliolate; stamens monadelphous; anthers unequal

Leaves simple or pinnate; stamens diadelphous; anthers equal

13. *Zornia*

Leaves odd-pinnate; stamens in 2 bundles of 5 each

Leaves simple or 3-foliolate; stamens in bundles of 9 and 1

14. *Aeschynomene*

Thorny herbs or undershrubs

Unarmed herbs:

15. *Allagi*

Sections of pods flattened

Sections of pods thick

16. *Desmodium*

Fruits geocarpic, i.e. maturing underground

17. *Alysicarpus*

18. *Arachis*

Tribe 5. *Vicieae*. Leaves paripinnate; rachis ending in a tendril or bristle; stamens diadelphous.

Climbers; stamens 9, the odd one absent; seeds scarlet

19. *Abrus*

Erect or diffuse herbs; stamens 10:

Leaflets toothed; petal wings free from the keel

20. *Cicer*

Leaflets entire or obscurely toothed; petal wings attached to the keel:

Staminal mouth oblique:

Style bearded in tuft or ring at apex

21. *Vicia*

Style bearded down one side

22. *Lens*

Staminal mouth truncate:

Leaflets entire; style flat at the apex

23. *Lathyrus*

Leaflets obscurely toothed; style dilated from base upwards

24. *Pisum*

- Tribe 6. *Phaseoleae*. Climbers, rarely erect trees or shrubs; leaves trifoliate, rarely simple or pinnate; stamens mono- or diadelphous.
- Subtribe 1. *Glycininae*: Leaves not gland-dotted; leaflets stipellate; flowers small; style beardless.
- Stamens monadelphous; alternate anthers abortive 25. *Teramnus*
- Subtribe 2. *Erythrinae*: Leaves not gland-dotted; leaflets stipellate; flowers conspicuous.
- Twining unarmed shrubs 26. *Mucuna*
- Trees or shrubs with prickly branches 27. *Erythrina*
- Subtribe 3. *Galactinae*: Leaves not gland-dotted; leaflets stipellate; petals equal:
- Twining shrubs; stamens monadelphous 28. *Pueraria*
- Trees; stamens diadelphous 29. *Butea*
- Subtribe 4. *Phaseolinae*: Leaves not gland-dotted; stamens diadelphous; style bearded:
- Stigma terminal:
- Petals equal 30. *Dolichos*
- Petals very unequal 31. *Clitoria*
- Stigma oblique:
- Petal keel forming a spiral 32. *Phaseolus*
- Petal keel not spirally twisted 33. *Vigna*
- Subtribe 5. *Cajaniinae*: Leaves gland-dotted beneath; leaflets exstipellate; style beardless.
- Pods 1 to 2-seeded 34. *Rhynchosia*
- Pods 3 or more seeded:
- Seeds arillate 35. *Atylosia*
- Seeds non-arillate 36. *Cajanus*
- Tribe 7. *Dalbergieae*. Leaves imparipinnate; stamens mono- or diadelphous; pods continuous.
- Leaflets opposite:
- Climbers; pods winged 37. *Derris*
- Trees; pods not winged 38. *Pongamia*
- Leaflets alternate 39. *Dalbergia*
- Tribe 8. *Sophoreae*. Leaves imparipinnate; stamens free.
- Pods moniliform 40. *Sophora*
- The following artificial key is provided to facilitate quick determination of the genera:
1. Flowers white or whitish;
 2. Herbs;
 3. Leaves ending in a tendril;
 4. Stipules large, foliaceous, auricled 24. *Pisum*
 4. Stipules small, non-foliaceous, semi-sagittate 21. *Vicia*

3. Leaves not ending in a tendril :
 5. Leaflets 3 6. *Melilotus*
 5. Leaflets more than 3 :
 6. Leaflets sharply cut or serrate 20. *Cicer*
 6. Leaflets entire 11. *Tephrosia*
2. Climbers or twiners :
 7. Pods winged along sutures 37. *Derris*
 7. Pods not winged :
 8. Petals equal 30. *Dolichos*
 8. Petals very unequal 31. *Clitoria*
1. Flowers yellow, yellowish or greenish-yellow :
 9. Leaves absent ; stipules 2, foliaceous 23. *Lathyrus*
 9. Leaves present ; stipules, if present, not foliaceous :
 10. Leaves simple :
 11. Fruits geocarpic, i.e. maturing underground ; plants herbaceous, cultivated 18. *Arachis*
 11. Fruits aerial :
 12. Prostrate herbs 1. *Heylandia*
 12. Erect herbs, undershrubs or shrubs 2. *Crotalaria*
 10. Leaves compound :
 13. Leaflets three :
 14. Leaves gland-dotted beneath :
 15. Habit erect ; species cultivated 36. *Cajanus*
 15. Habit twining ; species wild :
 16. Pods 1 to 2-seeded 34. *Rhynchosia*
 16. Pods 3 to 4-seeded 35. *Arctostaphylos*
 14. Leaves not gland-dotted beneath :
 17. Trees 39. *Dalbergia*
 17. Herbs or shrubs :
 18. Stamens monadelphous ; pods obliquely subglobose 2. *Crotalaria*
 18. Stamens diadelphous ; pods linear, subglobose or roundish :
 19. Pods spinous, spirally twisted 4. *Medicago*
 19. Pods glabrous or hairy, not spirally twisted :
 20. Leaves digitately 3-foliolate 3. *Trifolium*
 20. Leaves pinnately 3-foliolate :
 21. Leaflets under 25 mm. long :
 22. Pods straight or recurved 5. *Trigonella*
 22. Pods short, round or oblong 6. *Melilotus*
 21. Leaflets 25 mm. or more in length :

- 23. Petal keel forming a spital 32. *Phaseolus*
- 23. Petal keel not spirally twisted 33. *Vigna*
- 13. Leaflets 5 or more :
 - 24. Stamens free : leaves oblong-orbicular : shrubs 40. *Sophora*
 - 24. Stamens 9, in one bundle : trees 39. *Dalbergia*
 - 24. Stamens diadelphous : shrub-like or small trees :
 - 25. Stamens in 2 bundles of 5 each 14. *Aeschynomene*
 - 25. Stamens in 2 bundles of 9+1 10. *Sesbania*
- 1. Flowers pink, light purple, lilac, orange-red, scarlet or reddish :
 - 26. Trees :
 - 27. Leaflets 3 :
 - 28. Trees with prickly branches 27. *Erythrina*
 - 28. Trees with unarmed branches 29. *Butea*
 - 27. Leaflets more than 3 :
 - 29. Leaflets glaucous, coriaceous 12. *Millettia*
 - 29. Leaflets not glaucous, subcoriaceous 38. *Pongamia*
 - 26. Herbs, shrubs or twiners :
 - 30. Leaves ending in a tendril :
 - 31. Leaflets 2 23. *Lathyrus*
 - 31. Leaflets more than 2 :
 - 32. Stipules large, foliaceous 24. *Pisum*
 - 32. Stipules not foliaceous :
 - 33. Species wild : style bearded in tuft or ring at the apex 21. *Vicia*
 - 33. Species cultivated : style bearded down one side 22. *Lens*
 - 30. Leaves not ending in a tendril :
 - 34. Leaves simple :
 - 35. Thorny herbs or undershrubs 15. *Alhagi*
 - 35. Unarmed herbs or undershrubs :
 - 36. Pods 1 to 2-seeded, globose or oblong 8. *Indigofera*
 - 36. Pods more than 2-seeded :
 - 37. Pods continuous or scarcely jointed, dehiscent 11. *Tephrosia*
 - 37. Pods torulose or of several, 1-seeded joints :
 - 38. Pods distinctly torulose 8. *Indigofera*
 - 38. Pods jointed, separating into indehiscent joints :
 - 39. Joints of pods turgid 17. *Alysicarpus*
 - 39. Joints of pods flattened 16. *Desmodium*

- 34. Leaflets 3 :
 - 40. Habit erect, prostrate or diffuse but not twining :
 - 41. Flowers large, showy ; trunk armed with prickles 27. *Erythrina*
 - 41. Flowers small, not showy ; stems unarmed 16. *Desmodium*
 - 42. Prostrate herbs 8. *Indigofera*
 - 42. Erect or suberect herbs :
 - 43. Pods short, not more than 4 cm. ; species wild 33. *Vigna*
 - 43. Pods above 10 cm. ; species cultivated 25. *Teramnus*
 - 40. Twining or climbing herbs or shrubs :
 - 44. Corolla small, little exerted ; species wild 30. *Dolichos*
 - 44. Corolla large, much-exserted ; species cultivated :
 - 45. Style bearded 28. *Pueraria*
 - 45. Style beardless 20. *Cicer*
- 34. Leaflets more than 3 :
 - 46. Leaflets sharply serrate 19. *Abrus*
 - 46. Leaflets entire :
 - 47. Herbaceous climbers ; stamens 9 22. *Lens*
 - 47. Erect, diffuse or prostrate herbs or undershrubs ; stamens 10 :
 - 48. Seeds 2 or 1 :
 - 49. Flowers pale purple, solitary or in racemes 8. *Indigofera*
 - 49. Flowers bright red, in dense, spiciform heads 8. *Indigofera*
 - 48. Seeds more than 2 :
 - 50. Anthers apiculate 11. *Tephrosia*
 - 50. Anthers not apiculate 23. *Lathyrus*
- 1. Flowers blue, violet, dark purple or maroon :
 - 51. Leaves ending in a tendril :
 - 52. Leaflets 2 ; stipules not large 24. *Pisum*
 - 52. Leaflets more than 2 ; stipules large, foliaceous 4. *Medicago*
 - 51. Leaves not ending in a tendril :
 - 53. Pods spirally twisted ; flowers purplish ; leaflets 3 9. *Psoralea*
 - 53. Pods not spirally twisted ; leaves simple or compound :
 - 54. Seed 1 ; leaves simple or trifoliate 20. *Cicer*
 - 54. Seeds 2 to many :
 - 55. Herbs ; leaflets sharply serrate 26. *Mucuna*
 - 55. Climbers or twiners :
 - 56. Leaflets 3

56. Leaflets more than 3 31. *Clitoria*
 55. Erect trees or shrubs :
 57. Pods moniliform ; seeds bright red ; stamens free 40. *Sophora*
 57. Pods entire or torulose ; seeds not red :
 Shrubs or small trees ; pods dehiscent, narrowly
 linear, twisted 10. *Sesbania*

1. Flowers with mixed colours, white, purple and
 blue (depending on age of flower) :
 58. Joints of pods turgid 17. *Alysicarpus*
 58. Joints of pods flattened 16. *Desmodium*

1. *Heylandia* DC.

H. latebrosa DC. Mém. Lég. 6 : 201, 1825 ; FBI. 2 : 65 ; FUGP. 1 : 200.

A prostrate, much-branched, hairy herb. Leaves simple, 8×5 mm., close-set, cordate-ovate, unequal at the base. Flowers yellow, solitary, axillary. Pods oblong, 5.7×4 mm., flat, silky.

Occurs in fields ; collected once from the fields near Todapur, I.A.R.I.

Flowers and Fruits : March-April

J. K. Maheshwari 1414

2. *Crotalaria* Linn.

Leaves trifoliolate *C. medicaginea*

Leaves simple :

Shrubs ; pods silky-hairy *C. juncea*

Herbs or undershrubs ; pods glabrous or villous :

Stipules absent ; much-branched, xerophytic undershrubs *C. burhia*

Stipules present ; herbs or undershrubs :

Stipules large, leafy *C. sericea*

Stipules small, linear *C. mysorensis*

C. medicaginea Lamk. var. *luxurians* Baker in FBI. 2 : 81, 1876 ; FUGP. 1 : 207.

An erect, perennial herb or undershrub with several, ascending branches. Colour of roots like that of turmeric. Leaflets variable in shape. Flowers yellow, in many-flowered, erect, often leaf-apposed racemes. Pods obliquely subglobose, 5×5 mm., 2-seeded. Seeds polished.

Common in the fields of Jowar (*Sorghum vulgare* Pers.), Gawar (*Cyamopsis tetragonoloba* Taub.), San hemp (*Crotalaria juncea* Linn.) and other crops. Not common on the Ridge. Also met occasionally on the lawns, fallow fields, in disturbed places and along roadsides. Given as a fodder to camels and goats.

Local name : Gulali ; Jhojhru
 Flowers and Fruits : July-Nov.
 J. K. Maheshwari 431 ; 445 ; 458

C. jancea Linn. Sp. Pl. 714, 1753 ; FBI. 2 : 79 ; FUGP. 1 : 206 ; Merr. Enum. 2 : 272.

A tall, stiff shrub. Leaves linear or oblong. Inflorescence and young parts shining with golden yellow hairs. Flowers bright yellow, fragrant, in erect, terminal or lateral, lax racemes.

Cultivated as a rainy season crop for its fibre which is used for making ropes, etc. Also met as an escape in waste places near fields. The flowers are eaten as vegetable.

Local name : Sanai ; English name : San hemp
 Flowers and Fruits : Sept.-Oct.

J. K. Maheshwari 444, Najafgarh

C. burhia Buch.-Ham. in Wall. Cat. 5386, 1831-1832, nom. nud. ; Benth. in Hook. Lond. Jour. Bot. 2 : 474, 1850, cum descript. ; FBI. 2 : 66 ; FUGP. 1 : 202 ; Parker, For. Fl. 128.

An erect or diffuse, much-branched, xerophytic undershrub. Leaves simple, oblong or lanceolate. Flowers yellow with reddish veins. Pods oblong, villous.

Found in sandy and rocky areas near villages in the district. The branches and leaves are used as fodder.

Local name : Jhamo ; Khip ; Kauriala
 Flowers : May-Sept.

J. K. Maheshwari 752 ; 1393, Najafgarh

C. sericea Retz. Obs. 5 : 26, 1788 ; FBI. 2 : 75 ; FUGP. 1 : 205.

A rare plant. Harbhajan Singh (Ind. Jour. Agric. Sci. 15(6) : 304, 1945) records this species from the district.

An erect, robust undershrub. Leaves oblong-lanceolate ; stipules leafy, persistent. Bracts leafy. Flowers yellow, tinged with purple. Pods stipitate, oblong.

Local name : Sanni
 Flowers : Cold season

C. mysorensis Roth, Nov. Pl. Sp. 338, 1821 ; FBI. 2 : 70 ; FUGP. 1 : 204.

Harbhajan Singh (loc. cit.) records the occurrence of this species in Delhi. I have not seen the living plants in the field.

A much-branched herb. Leaves linear-oblong. Stipules linear. Flowers yellow ; bracts leafy. Pods oblong.

3. *Trifolium* Linn.

T. alexandrinum Linn. Cent. Pl. 1 : 25, 1755 ; Bailey, Man. Cult. Pl. 581.

An annual, 30-60 cm. tall. Leaflets oblong, obtuse, 3.4×1 cm. Flowers greenish-yellow, in dense, globular or ovate-oblong, about 2×1.5 cm. heads. Bracts forming involucre at base. Calyx teeth long-subulate. Native of Egypt and Syria. Cultivated in the Government Agricultural Farms of the district and in I.A.R.I. for its importance as a green manure. Also used as fodder. The tops are removed 3-4 times during the same season. Grown especially to increase soil fertility.

Local name : Berseem

Flowers and Fruits : Cold season

J. K. Maheshwari 1090, Univ. Bot. Garden

4. *Medicago* Linn.

Plants wild ; flowers yellow

M. denticulata

Plants cultivated ; flowers purplish

M. sativa

M. denticulata Willd. Sp. Pl. 3 : 1414, 1802 ; FBI. 2 : 90 ; FUGP. 1 : 211.

A glabrous annual with prostrate branches. Leaflets obovate-cuneate, faintly toothed. Flowers yellow, few, umbelled ; bracts scarious. Pods subglobose, of 2-4 spirals, spinous, about 6×6 mm.

Common as a winter weed in cultivated fields and moist, waste localities ; forms the dominant vegetation in some parts. Often met along with *Melilotus indica* All., *M. alba* Desr., *Trigonella incisa* Benth., and other weeds. Used by the poorer classes as a leafy vegetable mixed with potatoes, etc.

Local name : Miana ; Chandausi

Flowers and Fruits : Cold season

J. K. Maheshwari 574, Shahdara

M. sativa Linn. Sp. Pl. 778, 1753 ; Bailey, Man. Cult. Pl. 582.

An erect, hairy, branched perennial, grown as an annual, 0.3-1 m. high. Leaflets obovate, oblanceolate, denticulate towards the apex. Flowers purplish, in close racemes. Pods with 2 or 3 spirals.

Cultivated during the cold season and early summer months for its importance as a fodder. The crop is generally harvested before flowering commences.

Local name : Rijka

Flowers and Fruits : Late winter and early summer

J. K. Maheshwari 46, Timarpur ; 1014, Azadpur fields

5. *Trigonella* Linn.

Pods narrow, linear, falcate

T. corniculata

Pods long, turgid, usually curved ;

Pods long-beaked

T. foenum-graecum

Pods not beaked

T. incisa

T. corniculata Linn. Syst. 1180, 1759; FBl. 2:88; FUGP. 1:210.
A branched, suberect annual, 30 cm. or more tall. Leaflets 2.5-3
2-2.5 cm.; stipules toothed. Flowers yellow, in close racemes. Pods
narrow, falcately curved, glabrous.

A winter weed in fields, lawns and waste places.

Flowers and Fruits: Dec.-March
J. K. Maheshwari 755

T. foenum-graecum Linn. Sp. Pl. 777, 1753; FBl. 2:87; FUGP.
1:209.

An erect annual. Leaflets toothed. Flowers pale yellow. Calyx
lobes subulate. Pods 5-8 cm. long, with a long, persistent beak.

Cultivated as a cold season fodder and vegetable crop. The dried
plant gives off a peculiar odour.

Local name: Methi

Flowers and Fruits: Feb.-March

J. K. Maheshwari 605, Najafgarh

T. incisa Benth. in Royle, Ill. 197, 1835; Sirjaev in Publ. Fac. Sc. Univ.
Masaryk No. 136; Il. 1931.

A slender, prostrate, suberect or diffuse annual. Leaflets obovate,
sharply inciso-dentate in the upper half. Flowers yellow. Pods 3-5 x
0.2 cm., sickle-shaped, flat.

Found as a winter weed in fields; often occurs in association with
Medicago denticulata Willd. It is picked up by the poorer classes and
used as vegetable.

Local name: Chanihari

Flowers and Fruits: Dec.-March

J. K. Maheshwari 617

6. *Melilotus* Juss.

Flowers white *M. alba*
Flowers yellow *M. indica*

M. alba Desr. in Lamk. Encycl. 4:63, 1797; FBl. 2:89; FUGP.
1:208.

An erect or decumbent annual. Leaflets obovate, oblong, entire or
distantly serrulate. Flowers half to full pendulous. Pods 5 mm. long,
round-oblong.

Common as a winter weed in fields, along canal banks and waste
grounds. It is used for bee-keeping.

Local name: Khandai

Flowers and Fruits : Dec.-April
J. K. Maheshwari 1094, Timarpur

M. indica All. Fl. Pedem. 1 : 308, 1785 ; FUGP. 1 : 208 ; Santapau in
RBSI. 16(1) : 63, 1953.

M. parviflora Desf. Fl. Atlant. 2 : 192, 1798 ; FBI. 2 : 89.

An erect annual, 20-45 cm. tall. Flowers small, in dense-flowered
racemes. Pods glabrous, 1-seeded.

A common winter weed in moist, waste places, along rivulets, and in
cultivated fields. Used as green fodder.

Local name : Metha ; Senji

Flowers and Fruits : Dec.-June

J. K. Maheshwari 603, University Campus

7. *Cyamopsis* DC.

C. tetragonoloba (Linn.) Taub. in Engl. & Prantl, Nat. Pfam. 3(3) : 259,
1894.

Psoralea tetragonoloba Linn. Mant. 104, 1767.

Cyamopsis psoraloides DC. Prodr. 2 : 216, 1825 ; FBI. 2 : 92 ; FUGP.
1 : 248.

An erect, robust annual. Leaflets 3, ovate-elliptic, coarsely toothed.
Flowers pinkish-purple, in axillary racemes. Pods erect. Seeds dull,
compressed.

Commonly cultivated during the rainy season for its pods which are
used as vegetable and for feeding cattle ; often grown in fields of Jowar
and Bajra.

Local name : Guar ; Gawar

Flowers and Fruits : July-Nov.

J. K. Maheshwari 191, Azadpur

8. *Indigofera* Linn.

1. Leaves simple :

2. Leaves linear ; pods globose, 1-seeded *I. linifolia*

2. Leaves ovate ; pods oblong, 1 to 2-seeded *I. cordifolia*

1. Leaves uni- to trifoliate ; pods torulose *I. oblongifolia*

1. Leaves 3-foliate to imparipinnate ; pods not torulose :

3. Flowers in dense, spike-like heads *I. enneaphylla*

3. Flowers in racemes :

4. Pods flat, reflexed *I. hochstetteri*

4. Pods turgid : *I. trita*

5. Leaflets 3 *I. trita*

5. Leaflets 5-13 : *I. trita*

6. Pods tetragonous, hirsute *I. astragalina*

6. Pods cylindrical, glabrous *I. tinctoria*

L. linifolia Retz. Obs. 4 : 29, 1786 & 6 : 33, t. 2, 1791 ; FBI. 2 : 92 ; FUGP. 1 : 249 ; Gillett in Kew Bull. Add. Ser. 1 : 35, 1958.

A trailing or procumbent, much-branched herb. Leaves linear, flowers bright red, in 1 to 8-flowered, short racemes. Pods silvery-white, about 2 x 2 mm. Seeds polished.

Common in lawns, often associated with other turf-forming legumes like *Alysicarpus monilifer* DC., *A. vaginalis* DC., and *Desmodium triflorum* DC.

Local name : Leel ; Sankhahuli

Flowers and Fruits : Pre-monsoon and monsoon period

J. K. Maheshwari 1091

L. cordifolia Heyne ex Roth, Nov. Pl. Sp. 357, 1821 ; FBI. 2 : 93 ; FUGP. 1 : 250 ; Gillett, loc. cit.

A prostrate or diffuse annual, clothed with long, white hairs. Leaves ovate, densely hairy. Flowers red, in small, sessile heads. Pods terete, oblong.

Common in lawns and waste places.

Flowers and Fruits : Rainy season

J. K. Maheshwari 1088

L. oblongifolia Forsk. Fl. Aegypt.-Arab. 137, 1775 ; FUGP. 1 : 253. *L. paucifolia* Delile, Fl. Égypte 251, 1813 ; FBI. 2 : 97.

A woody, scrubby, diffuse undershrub. Branches many, stout, dark purplish, silvery-canescens. Leaves 1 to 3-foliolate, reduced to one leaflet on the lower branches, glabrous, oblanceolate or oblong-elliptic. Flowers vermilion-red, in many-flowered racemes. Pods purplish, distinctly torulose, pointed, deflexed, straight or curved, 15-20 x 1.5 mm.

Rather rare in Delhi. Found only on the way to Gurukul Indraprastha near the railway line from Delhi to Faridabad in open depressed places, growing along with *Zizyphus nummularia* Wt. & Arn.

Local name : Jhungi ; Vilayti jhojhru

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 1239 ; 1331

L. enneaphylla Linn. Mant. 272, 1771 ; FBI. 2 : 94 ; FUGP. 1 : 250 ; Gillett, loc. cit.

A mat-forming, prostrate herb. Stems appressed hairy. Leaflets 7-9, hirsute. Flowers small, bright red, in dense heads. Pods oblong, hispid, about 5 x 2 mm. Seeds 2.

Common during the monsoon period forming a dense mat in lawns. Grows on the Ridge in dry, gravelly soil. Can serve as an efficient soil binder due to its characteristic habit.

Local name : Leel

Flowers and Fruits : Summer and rainy seasons
J. K. Maheshwari 174 ; 237, Ridge

- L. hochstetteri* Baker in Fl. Trop. Africa 2 : 101, 1871 ; Cufodontis in Bull. Jard. Bot. Brux. Suppl. 25 : 266, 1935 ; Gillett, op. cit. 13.
L. anabaptista Steud. Nom. 1 : 805, 1840, nom. nud. ; Baker in FBI. 2 : 102, 1876, cum descript. ; FUGP. 1 : 251.

A diffuse, annual herb, with lateral spreading branches. Leaflets 3-7, elliptic, lanceolate to oblanceolate. Flowers vermillion-coloured, in dense racemes. Pods linear, reflexed, flat, 6 to 8-seeded.

Common in lawns on moist sandy soil during rains ; often seen in the University Campus amongst grasses. Also known from the hilly tracts in the undergrowth. The leaves turn brownish-black after drying. Used as fodder.

Local name : Khandidal

Flowers and Fruits : Rainy season

J. K. Maheshwari 21, University Grounds

- L. trita* Linn. f. Suppl. 335, 1781 ; FBI. 2 : 96 ; FUGP. 1 : 252.

A stout herb or undershrub, 60-90 cm. tall. Branches clothed with appressed pubescence. Leaflets 3, end one petiolulate. Flowers reddish, in congested, spike-like racemes. Pods deflexed, 4-gonous, pointed, appressed hairy, 2.5-3 × 0.2 cm. Seeds 2 × 1 mm.

Occurs on the Ridge and in waste places near gardens, often in depressed ground.

Flowers and Fruits : Sept.-Feb.

J. K. Maheshwari 727 ; 765 ; 1092, Old Delhi Ridge

- L. astragalina* DC. Prodr. 2 : 228, 1825 ; Gillett in Kew Bull. Add. Ser. 1 : 110, 1958.

L. hirsuta sensu Baker in FBI. 2 : 98, 1876, in part (non Linn.).

A bushy herb or undershrub, 0.6-1.2 m. tall. Stems with grey or brown pubescence. Leaflets 5-11, opposite, 3-4 × 1.5 cm. Flowers vermillion-red, crowded in erect racemes. Pods 1.2-2 × 0.3-0.35 cm., densely hairy, pointing downwards. Seeds 2 × 1.5 mm.

Common on the Ridge during the monsoon period, in shallow depressions and amongst bushes.

Flowers and Fruits : Sept.-Nov.

J. K. Maheshwari 462, Ridge

- L. tinctoria* Linn. Sp. Pl. 751, 1753, in part ; FBI. 2 : 99 ; FUGP. 1 : 254 ; Parker, For. Fl. 131 ; Gillett, op. cit. 106.

An undershrub or shrub. Leaves turning black when dried. Leaflets 7-13, bluish-green. Flowers pink, in spike-like racemes. Pods 2-3.5 × 0.2-0.25 cm., glabrous, pointed, brown.

Found wild on the Ridge and in the neighbouring hilly tracts.

Local name : Leel

Flowers : Rainy season. Fruits : Cold season

J. K. Maheshwari 840, Qutab

9. *Psoralea* Linn.

Leaves simple ; young parts clothed with dark purple pubescence

Leaves trifoliate ; young branches minutely prickly *P. corylifolia*

P. corylifolia Linn. Sp. Pl. 764, 1753 ; Royle, Ill. 191 ; FBI. 2 : 103 ; FUGP. 1 : 241.

An erect, woody herb, 30-100 cm. tall with horizontally spreading, gland-dotted branches. Young parts clothed with appressed, dark purple pubescence. Leaves simple, shortly petiolate, broad ovate to roundish, repand-toothed, gland-dotted. Flowers purple, in axillary, long-peduncled heads, bracteate. Ovary 1-ovuled.

Rare ; met with in dry, waste and disturbed gravelly areas.

Flowers : Feb.-March

J. K. Maheshwari 1384, University Compound

P. plicata Delile, Fl. Égypte 252, t. 37, f. 3, 1813 ; Parker, For. Fl. 128.

A bushy, much-branched undershrub. Young branches with minute prickles. Leaflets 3, obovate, undulate or crisped. Flowers pale violet, in axillary and terminal racemes. Calyx accrescent. Standard white. Wings and keel coloured dark violet above. Anthers pale yellow. Ovary shortly stipitate ; style curved. Pods as long as the calyx, oblong-globose, 1-seeded, 5 × 3 mm.

The plant has been collected from one spot only 'Bharoli ka Rakba', near Railway Chowki No. 6 (Azadpur-Karnal Road) on dry soil in waste land. Young pods yield a yellow dye.

Flowers and Fruits : May

J. K. Maheshwari 1018, Karnal Road

10. *Sesbania* Scop. nom. cons.

Prickly shrubs or undershrubs *S. bispinosa*

Unarmed shrubs or small trees *S. sesban*

S. bispinosa (Jacq.) Fawcett & Rendle, Fl. Jam. 4 : 24, 1920 ; Bor, Man. Ind. For. Bot. 92 ; Santapau in RBSI. 16(1) : 65, 1953.

Aeschynomene bispinosa Jacq. Ic. 3 : 13, t. 564, 1793.

Sesbania aculeata Pers. Syn. 2 : 316, 1807 ; FBI. 2 : 114 ; FUGP. 1 : 243.

An erect, weak-stemmed shrub. Branches and leaf rachis prickly. Leaflets several. Flowers yellow. Pods long, narrowly linear, subtorulose.

Found along canal banks and also in cultivated and fallow fields.

Local name : Dhedhan

Flowers and Fruits : Sept.-Oct.

J. K. Maheshwari 446, along Najafgarh Canal

S. sesban (Linn.) Merr. in Philip. Jour. Sci. (Bot.) 7 : 235, 1912 ; Bor,
Man. Ind. For. Bot. 91 ; Benthall, Trees Calc. 143.

Aeschynomene sesban Linn. Sp. Pl. 714, 1753.

Sesbania aegyptiaca Pers. Syn. 2 : 316, 1807 ; FBI. 2 : 114 ; FUGP.
1 : 242.

A glabrous, soft-wooded, large shrub or small tree. Leaflets many,
1.5-2.5 x 0.4-0.6 cm., linear-oblong. Flowers pale yellow, maroon or
dotted, drooping. Pods 15-23 x 0.4 cm., torulose, twisted, many-seeded.

Cultivated in the city and neighbouring villages as hedge for its quick
growth and shade-providing capacity. An excellent gunpowder charcoal
is made from its soft, white wood.

Local name : Jait ; Rawasan

Flowers and Fruits : Cold season

Flowers yellow dotted with purple *S. sesban* var. *picta*

Flowers dark maroon or purple outside *S. sesban* var. *bicolor*

S. sesban Merr. var. *picta* Santapau, Pl. Saur. 14, 1953.

S. aegyptiaca Pers. var. *picta* Prain in JASB. 66 : 367, 1897 ; FUGP.
1 : 242.

Grown commonly as a hedge around bungalows and fields and also
cultivated.

Local name : Rawasan

Flowers and Fruits : Cold season

J. K. Maheshwari 567, Azadpur Road ; 744, Kamla Nagar

S. sesban Merr. var. *bicolor* (Wt. & Arn.) F. W. Andr. in Kew Bull. 93,
1953.

S. aegyptiaca Pers. var. *bicolor* Wt. & Arn. Prodr. 214, 1834 ; FUGP.
1 : 243.

Grown commonly as a hedge along roadsides and fields. Also culti-
vated for shade. During winter birds are attracted by the dark maroon
flowers.

Local name : Jait ; Rawasan

Flowers and Fruits : Cold season

J. K. Maheshwari 580, Bela

11. *Tephrosia* Pers. nom. cons.

Leaves simple

T. strigosa

Leaves imparipinnate :

Pods densely soft-tomentose

Pods glabrescent or finely hairy :

A suberect, glabrescent, robust herb or undershrub

A diffuse, downy herb

T. villosa

T. purpurea

T. pumila

T. strigosa (Dalz.) Santapau & Mahesh. in JBNHS, 54 : 804, 1957.

Macronyx strigosus Dalz. in Hook. Kew Jour. 2 : 35, 1850.

Tephrosia tenuis Wall. Cat. 5970, 1831-2, nom. nud. ; Dalz. & Gibs. Bomb. Fl. 61, 1861 ; FBI. 2 : 111 ; FUGP. 1 : 244.

A grass-like, branched, slender herb, 15-30 cm. long. Stems filiform. Leaves linear, 3-6 x 0.3-0.6 cm. Flowers pale violet, axillary, on filiform pedicels. Pods linear, 2-2.5 x 0.4 cm., pointed, 6 to 10-seeded.

Common during the monsoon period on the Ridge and grassy lands, hidden amongst grasses and recognizable only at the time of fruiting.

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 309 ; 756

T. villosa (Linn.) Pers. Syn. 2 : 329, 1807 ; FBI. 2 : 113 ; FUGP. 1 : 245.

Galega villosa Linn. Syst. 1172, 1759.

An erect or diffuse undershrub. Leaflets 9-11. Flowers pale pink or pale violet, in erect racemes. Calyx villous. Pods deflexed, soft tomentose, 2.5-3.5 x 0.5 cm.

Common on the Ridge on dry, gravelly soils and the steep slopes of rocks in crevices. The flowers open in the evening.

Flowers and Fruits : Rainy season

J. K. Maheshwari 274, Ridge

T. purpurea (Linn.) Pers. Syn. 2 : 329, 1807 ; FBI. 2 : 112 ; FUGP. 1 : 245 ; Parker, For. Fl. 133.

Cracca purpurea Linn. Sp. Pl. 752, 1753.

A suberect, much-branched, robust herb or undershrub. Leaflets 7-13, obovate to oblanceolate. Flowers red or purplish, in leaf-apposed racemes or fascicled. Pods 4-5 x 0.4-0.5 cm., glabrescent.

Common on dry, gravelly, sandy and other soils in open places of the Ridge and in waste ground. The roots are used in medicine. An extract from the pods is said to be useful in relieving bodily pains and inflammation troubles.

Local name : Jhojhru ; Pawad ; Jangli-mothar ; Sarphonka

Flowers and Fruits : June-Oct.

J. K. Maheshwari 148, Ridge

T. pumila Pers. Syn. 2 : 330, 1807 ; FUGP. 1 : 245.

T. purpurea Pers. var. *pumila* Baker in FBI. 2 : 113, 1876.

A small, diffuse, deep-rooted herb. Leaflets 5-9, downy, oblanceolate.

Flowers white, reddish or pinkish, 1-3 on slender peduncles. Pods straight, downy, $3-3.5 \times 0.4$ cm.

Occurs in the hilly tracts and along canal banks, hidden amongst grasses in moist places.

Flowers and Fruits : Rainy season
J. K. Maheshwari 1293 ; 1318

12. *Millettia* Wt. & Arn.

M. ovalifolia Kurz in JASB. 42(2) : 68, 1873 (excl. syn. Wt. & Arn.) ; FBI. 2 : 107 ; Benthall, Trees Calc. 145.

A medium-sized tree. Leaflets 7, ovate-elliptic, glaucous. Flowers mauve or lilac, in pendulous racemes. Pods $5-10 \times 1.3-1.7$ cm., 2 to 3-seeded, narrowed to the base.

Planted in gardens for its beautiful flowers.

Fruits : Aug.

J. K. Maheshwari 707

13. *Zornia* J. F. Gmel.

Z. diphylla (Linn.) Pers. Syn. 2 : 318, 1807 ; FBI. 2 : 147 ; FUGP. 1 : 268.

Hedysarum diphyllum Linn. Sp. Pl. 747, 1753.

A grass-like, diffuse herb. Leaflets 2, $2-4.5 \times 0.4-0.6$ cm., punctate beneath. Bracts large, geminate. Flowers yellow, 7 mm. long. Pods densely prickly.

Common on the Ridge and abundant in places under shrubs. Also found in fallow and cultivated fields as well as in waste places.

Flowers and Fruits : Rainy season

J. K. Maheshwari 464, Ridge

14. *Aeschynomene* Linn.

A. indica Linn. Sp. Pl. 713, 1753 ; FBI. 2 : 151 ; FUGP. 1 : 270 ; Merr. Enum. 2 : 282.

A shrubby, water-loving annual. Leaflets numerous, small. Flowers yellow veined with purple. Pods $4-5.5 \times 0.4-0.5$ cm., 6 to 10-jointed, dotted with black.

Common along canal banks. The basal part of the stem near water is swollen and bears bacterial nodules. Used as fodder.

Local name : Didhen ; Phulan

Flowers and Fruits : July-Nov.

J. K. Maheshwari 447, Najafgarh

15. *Alhagi* Desv.

A. pseudalhagi (Bieb.) Desv. Jour. de Bot. 1 : 120, 1813.

Hedysarum pseudalhagi Bieb. Fl. Taur. Cauc. 2 : 174, 1808.
Alhagi camelorum Fisch. Cat. Jard. Pl. Gorenki 72, 1812, nom. illegit.;

FUGP. 1 : 279 ; Parker, For. Fl. 143.

An erect, deep-rooted, spinous, bushy undershrub. Spines axillary, flower-bearing. Leaves obovate-oblong. Flowers red. Pods 2.5-4 × 0.3 cm., usually falcate, irregularly torulose. Seeds subreniform.

A gregarious weed in saline, sandy or rocky places as well as in fallow fields, growing alone or in association with *Tamarix troupii* Hole and *Suaeda fruticosa* Forsk. Used during hot summer months for making 'Tatties'. A fodder for camels. It is attacked by a disease which results in formation of leaf clumps.

Local name : Jawasa ; Bharbharra

Flowers : Summer. Fruits : June-July

J. K. Maheshwari 47 : 684, Najafgarh Canal Banks

16. *Desmodium* Desv. nom. cons.

Wiry, trailing herbs ; leaflets 3

Erect herbs or undershrubs ; leaves simple : *D. triflorum*

Petioles with broad wings

Petioles not winged : *D. pseudo-triquetrum*

D. gangeticum

D. triflorum (Linn.) DC. Prodr. 2 : 334, 1825 ; FBI. 2 : 173 ; FUGP. 1 : 285.

Hedysarum triflorum Linn. Sp. Pl. 749, 1753.

A much-branched, gregarious, wiry, trailing herb, rooting at the nodes. Leaflets obovate, obcordate, 5-8 × 5-8 mm. Flowers pink or purplish, 1-3 in the axils of leaves. Pods 1-1.5 × 0.3 cm., curved, flat, indented on the lower edge, 3 to 5-jointed. Seeds brown.

Common in lawns and pasture fields. Produces an excellent green turf and can serve as an efficient soil binder.

Flowers and Fruits : During rains and early winter

J. K. Maheshwari 533, Timarpur

D. pseudo-triquetrum DC. Prodr. 2 : 326, 1825 ; FUGP. 1 : 286 ; Parker, For. Fl. 154.

D. triquetrum Baker in FBI. 2 : 163, 1876, in part.

A diffuse undershrub. Leaves unifoliate ; petioles broadly winged. Pods flat, 6 to 8-jointed, with a line of appressed hairs along the sutures.

Flowers : Rainy season

D. gangeticum (Linn.) DC. Prodr. 2 : 327, 1825 ; FBI. 2 : 168 ; FUGP. 1 : 286 ; Parker, For. Fl. 155.

Hedysarum gangeticum Linn. Sp. Pl. 746, 1753.

An erect or decumbent undershrub or shrub, 60-120 cm. tall. Leaves

up to 15 × 8 cm., ovate-elliptic to ovate-oblong, grey-puberulous beneath. Flowers lilac, in several fascicles arranged in racemes. Pods deeply indented on lower suture, indehiscent, hooked-hairy, 2-2.5 × 0.3 cm.

Common during the monsoon and post-monsoon period in the Sabzi-mandi Gardens along canal banks. Also found as an undergrowth in the fruit orchards of Delhi.

Local name : Salpalni

Flowers and Fruits : Aug.-Nov.

J. K. Maheshwari 507, 21-Bigah Bagh (Azadpur)

17. *Alysicarpus* Desv. nom. cons.

Calyx about as long as the first joint of pod :

Pods moniliform *A. monilifer*

Pods not moniliform *A. vaginalis*

Calyx much longer than the first joint of pod :

Flowers usually in pairs on spike-like, lax racemes ; pods usually exerted *A. bupleurifolius*

Flowers in spike-like, rather dense racemes ; pods included or slightly exerted :

Joints of pods finely reticulate-veined *A. longifolius*

Joints of pods transversely and deeply plicate *A. rugosus*

A. monilifer DC. Prodr. 2 : 353, 1825 ; FBI. 2 : 157 ; FUGP. 1 : 276.

A prostrate, much-branched, deep-rooted herb. Stems densely tufted. Leaves simple, oblong, obtuse, often cordate. Flowers pink. Calyx persistent. Pods distinctly moniliform, 2 to 6-jointed ; segments subglobose, densely clothed with short, hooked hairs.

It appears during the rains in grassy places, often associated with other turf-forming legumes. Used as fodder.

Local name : Chatta ki ghas ; Jhuhighas

Flowers and Fruits : Sept.-Nov.

A. vaginalis DC. Prodr. 2 : 353, 1825 ; FBI. 2 : 158 ; FUGP. 1 : 277 ; Santapau in RBSI. 16(1) : 69, 1953.

An erect or prostrate herb, 30-60 cm. tall. Leaves very variable in size and shape, suborbicular or broad oblong to oblong and oblanceolate. Flowers small. Pods subterete, 6 to 8-jointed, rather crowded at the ends of branches.

Common all over in open pastures and in lawns, often amongst grasses and associated with other pasture, leguminous plants.

Flowers and Fruits : Sept.-Nov.

J. K. Maheshwari 379, University Campus ; 489

Var. *nummularifolius* Baker in FBI. 2 : 158, 1876.
Common in the same localities. Differs from the type in being slender and diffusely spreading. Lower leaves oblong ; upper ovate.

A. bipleurifolius DC. Prodr. 2 : 352, 1825 ; FBI. 2 : 158 ; FUGP. 1 : 277.

A diffuse or ascending herb. Leaves linear-lanceolate or oblong, shortly petiolate. Flowers pink, often in pairs on spike-like, loose racemes. Pods included or exserted, moniliform, stalked.

Common all over in moist, grassy spots and along canal banks.

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 86 ; 392, Najafgarh

A. longifolius Wt. & Arn. Prodr. 233, 1834 ; FBI. 2 : 159 ; FUGP. 1 : 278.

A stout, erect herb, 30-150 cm. tall. Leaves oblong or lanceolate. Stipules large. Flowers in long, spiciform racemes. Bracts large, caducous. Pods moniliform.

Occurs less commonly than other species, generally amongst grasses.

Flowers : Sept.-Nov.

J. K. Maheshwari 161, Shahdara

A. rugosus DC. Prodr. 2 : 353, 1825 ; FBI. 2 : 159 ; FUGP. 1 : 278.

An ascending herb. Leaves oblong or lanceolate. Flowers in long, spike-like racemes, appressed to the rachis. Pods nearly concealed in the calyx, apiculate, 2 to 5-jointed, transversely ribbed.

Found occasionally during the post-monsoon period.

Local name : Shevra

Flowers and Fruits : Sept.

J. K. Maheshwari 543, I.A.R.I.

18. *Arachis* Linn.

A. hypogaea Linn. Sp. Pl. 741, 1753 ; Merr. Enum. 2 : 283 ; Bailey, Man. Cult. Pl. 554.

A prostrate, diffuse or erect annual, 30-60 cm. tall. Leaves bipinnate. Leaflets 3.5-5 x 2-2.5 cm., oval to oval-obovate. Flowers yellow, showy, ephemeral. Pods 1 to 3-seeded, constricted between the seeds ; the pedicels elongate rapidly and soon after fertilization enter the ground where the ovary ripens into the reticulated pod. Seeds edible.

Cultivated for its pods ; kernels are eaten raw or roasted.

Local name : Mungphali

Flowers and Fruits : Aug.-Nov.

J. K. Maheshwari 357, Shahdara

19. *Abrus* Linn.

A. precatorius Linn. Syst. 472, 1767; FBI. 2 : 175; FUGP. 1 : 262 ;
Parker, For. Fl. 156.

A more or less woody climber. Leaves paripinnate. Flowers pinkish, in dense racemes. Corolla exserted. Pods oblong, turgid. Seeds scarlet with a black hilum.

Occurs on the Ridge, in the hilly tracts of Mehrauli and Faridabad and also in fruit orchards. The seeds called 'Ratti' are used as jeweller's weights and are said to be poisonous. The sweetish leaves are chewed with betel leaf.

Local name : Mulayti ; Ratti ; Chirmuthi ; Ghumchi

Flowers : Aug.-Sept. Fruits : Cold season

J. K. Maheshwari 1270, Ridge

20. *Cicer* Linn.

C. arietinum Linn. Sp. Pl. 738, 1753; FBI. 2 : 176; FUGP. 1 : 256.

A much-branched, glandular-pubescent annual. Leaflets 1-1.5 x 0.5-0.7 cm., closely serrate. Flowers pink, blue or white. Pods oblong, about 2.5 x 1.5 cm. Seeds reddish-brown, whitish or black.

Cultivated during the cold season for the seed which is eaten by human beings and also fed to horses. The vegetative parts are used as fodder.

Local name : Chana

Flowers and Fruits : Cold season

J. K. Maheshwari 611

21. *Vicia* Linn.

Leaflets 1-3 pairs

V. faba

Leaflets 5-12 pairs :

Flowers whitish, small ; pods 2-seeded

V. hirsuta

Flowers reddish-blue, larger ; pods more than 2-seeded

V. sativa

V. faba Linn. Sp. Pl. 737, 1753; FBI. 2 : 179; FUGP. 1 : 259.

An erect, glabrous, very leafy annual. Leaflets oval to oblong. Stipular nectaries conspicuous. Flowers dull white with a large, purplish spot. Pods large, thick.

Cultivated during the cold season for its young pods which are eaten as vegetable. It is available in the market during the months of February and March.

Local name : Bakla sem ; English name : Broad beans

Flowers and Fruits : Cold season

V. hirsuta (Linn.) S. F. Gray, Nat. Arr. Brit. Pl. 2 : 614, 1821; FBI. 2 : 177; FUGP. 1 : 258.

Ervum hirsutum Linn. Sp. Pl. 738, 1753.

A straggling or twining, small herb. Leaflets 5-8 pairs. Flowers very small, whitish. Corolla hardly exerted. Pods oblong-rhomboid, black, about 1×0.4 cm.

Common in cultivated and fallow fields.

Flowers and Fruits : Dec.-March

J. K. Maheshwari 790 ; 1174, Najafgarh

V. sativa Linn. Sp. Pl. 736, 1753 ; FBL 2 : 178 ; FUGP. 1 : 258.

A more robust and common weed than the preceding species. Stems suberect. Stipular nectaries present. Leaflets 6 pairs. Flowers reddish, solitary or paired. Corolla twice the calyx. Pods 8 to 10-seeded.

Abundantly found as a weed of cultivation in fields of sarson, wheat, etc. and also in moist, waste places. Used as fodder.

Local name : Chatri-matri ; Matra

Flowers and Fruits : Jan.-March

J. K. Maheshwari 1095, Timarpur

22. *Lens* Mill. nom. cons.

L. culinaris Medik. in Vorles. Churpf. Phys. Ges. 2 : 361, 1787; Bailey. Man. Cult. Pl. 553.

L. esculenta Moench, Meth. 131, 1794 ; FUGP. 1 : 257.

An erect or partially twining herb. Leaflets 4-6 pairs ; rachis ending in a tendril or bristle. Flowers pale purple. Pods compressed, smooth. Seeds 2, lenticular.

Cultivated for its edible seeds. The leaves and stems are given as fodder to cattle.

Local name : Masur

Flowers and Fruits : Cold season

J. K. Maheshwari 764

23. *Lathyrus* Linn.

Leaflets 0 ; stipules leaf-like ; flowers yellow *L. aphaca*

Leaflets 2 ; flowers blue or reddish-purple *L. sativus*

L. aphaca Linn. Sp. Pl. 729, 1753 ; FBL 2 : 179 ; FUGP. 1 : 260.

An annual with slender, branching stems. Stipules modified into leaves, about 3×2 cm. Leaves reduced to a tendril. Flowers yellow. Pods linear-oblong, $2.5-3 \times 0.6$ cm.

A winter weed in cultivated and fallow fields, lawns and in moist, waste places. Used as fodder.

Local name : Patteil

Flowers and Fruits : Jan.-March

J. K. Maheshwari 1093, Timarpur

L. sativus Linn. Sp. Pl. 730, 1753; FBI. 2: 179; FUGP. 1: 260.
A much-branched annual. Stems winged. Leaflets linear-lanceolate,
5.8 × 0.5-0.8 cm. Pods winged, 3.5 × 1 cm. Seeds compressed.
A winter legume. Found abundantly in the fields of gram, sarson, etc.
Used as fodder and the seeds are eaten as vegetable.

Local name: Khesari; Chapra-matra; Chatra-matra
Flowers and Fruits: Jan.-March
J. K. Maheshwari 595, Najafgarh

24. *Pisum* Linn.

Seeds globose, uniformly coloured
Seeds compressed, mottled

P. sativum

P. arvense

P. sativum Linn. Sp. Pl. 727, 1753; FBI. 2: 181; FUGP. 1: 261.
A more robust plant than *P. arvense* Linn. Suberect or climbing

annual. Leaflets oval to oblong. Flowers vari-coloured, on long
peduncles. Pods broad. Seeds round, white.

Cultivated extensively in Timarpur, in Khadar fields along the banks of
Jamuna River and in urban areas of the district. Used as fodder. The
buds are eaten as vegetable and the pods are sold in the market for peas.

Local name: Mattar; English name: Garden Pea
Flowers and Fruits: Jan.-March
J. K. Maheshwari 604; 1162

P. arvense Linn. Sp. Pl. 727, 1753; Royle, III: 200; FBI. 2: 181; FUGP.
1: 261.

A smooth, glaucous annual. Stipules large, ovate. Leaflets 4-6;
rachis ending in a branched tendril. Standard pink. Wings deep purple.
Pods reticulate. Seeds angled, greenish-yellow, mottled with red.

Grown as a winter season legume in the district. Royle (loc. cit.)
believes it indigenous in the Jamuna-Khadar area, near Delhi, where it is
known as "Urta mattar".

Flowers and Fruits: Jan.-March

25. *Teramnus* Sw.

T. labialis (Linn. f.) Spreng. Syst. 3: 235, 1826; FUGP. 1: 233.

Glycine labialis Linn. f. Suppl. 325, 1781.

A creeping, spreading or twining herb. Stems appressed-hairy.
Leaflets 3, subcoriaceous, pubescent beneath. Flowers pink, small, in
axillary racemes. Pods 3-7 × 0.3-0.4 cm., linear, appressed-hairy, the
remains of the style bent at right angles to the axis of the pod.

Common in Sabzimandi and Sarai Rohilla Gardens, either spreading on the ground or twining on shrubs and trees in shady places.

Flowers and Fruits : Sept.-Nov.

J. K. Maheshwari 1089, Roshanara Gardens

26. *Mucuna* Adans. nom. cons.

M. pruri Hook. Bot. Misc. 2 : 348, 1830-1831 ; Santapau in RBSI. 16(1) : 74, 1953 ; Bor. Man. Ind. For. Bot. 95.

M. pruriens Baker in FBI. 2 : 187, 1876 ; FUGP. 1 : 237 (non DC.).

A more or less extensive, climbing annual. Leaflets 3, ovate-rhomboid. Flowers dark purple, in large, drooping racemes. Pods 5-10 × 1.5-1.8 cm., 4 to 6-seeded, S-shaped, clothed with dense, pale brown, irritating bristles. Seeds with an oblong, funicular hilum.

Found in the hedges of gardens on Karnal Road, climbing upon trees and shrubs. The fruits develop after leaf fall. The bristles cause an intense skin irritation which continues for hours, and hence the plant should be carefully handled.

Local name : Kaunch

Flowers : Rainy season. Fruits : Cold season

J. K. Maheshwari 508 ; 560

27. *Erythrina* Linn.

Medium-sized trees ; flowers appearing before the leaves

. *E. variegata* var. *orientalis*

Small or medium-sized trees ; flowers appearing with the leaves :

Trees ; leaflets acute *E. suberosa*

Shrubby trees ; leaflets abruptly acuminate *E. blakei*

E. variegata Linn. var. *orientalis* (Linn.) Merr. Interpret. Herb. Amb. 276, 1917 & Enum. 2 : 306 ; Santapau in RBSI. 16 (1) : 75, 1953.

E. corallodendron Linn. var. *orientalis* Linn. Sp. Pl. 706, 1753.

E. indica Lamk. Encycl. 2 : 391, 1786.

A moderate-sized tree ; trunk armed with numerous prickles. Leaflets broad ovate to rhombic-ovate, nearly as long as broad. Flowers bright scarlet, showy, numerous. Calyx spathaceous.

Planted in gardens and near bungalows. Several trees can be seen in the campus of Delhi University and Rashtrapati Bhavan. The flowers appear on leafless branches and are visited by birds.

Local name : Rakta-madar

Flowers : March-April

J. K. Maheshwari 637

E. suberosa Roxb. Hort. Beng. 53, 1814, nom. nud. & Fl. Ind. 3 : 253.

1832; FBI. 2: 189; FUGP. 1: 238; Parker, For. Fl. 158; Blatt. & Mill. Beaut. Ind. Tr. 72.
A large shrub or small tree. Trunk corky, crooked, armed with prickles or smooth. Leaflets rhomboid, entire or lobed. Flowers scarlet, appearing with the leaves. Calyx campanulate.
Cultivated in private and public gardens as a hedge plant.

Flowers: Summer season

E. blakei Hort. ex Parker, For. Fl. 159, 1918; Blatt. & Mill. op. cit. 77.
A shrubby tree. Leaves rhomboid, deltoid, abruptly acuminate. Flowers bright scarlet.
Cultivated in public and private gardens.

Flowers: March-May

J. K. Maheshwari 1430

28. *Pueraria* DC.

P. thunbergiana (Sieb. & Zucc.) Benth. in JLS. 9: 122, 1867; Bailey, Man. Cult. Pl. 577.

Pachyrhizus thunbergianus Sieb. & Zucc. in Abh. Akad. Muench. 4(3): 237, 1846.

Pueraria hirsuta Schneid. Ill. Handb. Laubholz. 2: 114, 1907 (non Kurz).

A perennial, long-running, twining, hairy shrub. Leaflets 3, large, broad ovate to rhombic-ovate, 8-15 × 6-10 cm., stipellate. Flowers purple, in long, dense, axillary racemes. Pods flat, hairy, oblong-linear.

Native of China and Japan. Grown in the fields of Agronomy Division, I.A.R.I., where it has shown a grand performance and has been recommended for soil conservation.

English name: Kudzu vine

Flowers and Fruits: Late summer

J. K. Maheshwari 1411

29. *Butea* Roxb. ex Willd. nom. cons.

B. monosperma (Lamk.) Taub. in Engl. & Prantl, Nat. Pfam. 3(3): 366, 1894; Blatt. & Mill. op. cit. 12, t. 2.

Erythrina monosperma Lamk. Encycl. 2: 391, 1786.

Plaso monosperma Kuntze, Rev. Gen. 1: 202, 1891.

Butea frondosa Roxb. Pl. Cor. 1: 21, 1795; FBI. 2: 194; FUGP. 1: 240.

A small or moderate-sized, deciduous tree. Trunk often crooked. Latex red. Leaflets 3, coriaceous, broadly obovate from a cuneate or deltoid base. Flowers bright orange-red, appearing before the leaves, 5-8 cm. long. Pods pendulous, silky-tomentose, 10-13 × 4 cm. Seed 1.

Common on the Ridge. In the hilly tracts near Faridabad and Gurgaon (Punjab) the trees are so abundant that the tract gives the appearance of a *Butea* forest. The leaves are used for serving food and for wrapping up edibles. The trees are heavily defoliated by young boys who bring the leaves to the market for selling. The forest in full bloom against the sharp glare of the sun recalls the condition of a forest on fire, and hence its common name as 'Flame of the Forest'. The dye obtained from the flowers (known locally as 'Kesu') is used for colouring clothes.

Local name : Dhak ; Palas ; Kesu

Flowers : April-May

J. K. Maheshwari 658, Ridge

30. *Dolichos* Linn.

D. lablab Linn. Sp. Pl. 725, 1753 ; FBI. 2 : 209 ; FUGP. 1 : 228.

Lablab niger Medik. in Vorles. Churpf. Phys. Ges. 2 : 354, 1787.

A tall, nearly glabrous, twining shrub. Stipules basifixed. Leaflets broad ovate or deltoid. Flowers white or pink. Pods flat, beaked. 4.5 x 1.6 cm.

Cultivated for its pods which are available during the cold season.

Local name : Sem

Flowers : Sept.-Oct. Fruits : Cold season

J. K. Maheshwari 907

31. *Clitoria* Linn.

C. ternatea Linn. Sp. Pl. 753, 1753 ; FBI. 2 : 208 ; FUGP. 1 : 230

A rambling, beautiful climber. Leaflets 5-9, oval or oblong. Flowers more or less uniformly white or blue in the standard with white centre, the rest blue or white, solitary, axillary. Pods stipitate, flat.

Cultivated in hedges or on walls. Also found as an escape.

Local name : Gokarni

Flowers and Fruits : Nov.-Feb.

J. K. Maheshwari 275

32. *Phaseolus* Linn.

Stipules inserted above their bases ; pods cylindric :

Pods nearly glabrous :

Stipules large, oval *P. trilobus*

Stipules small, lanceolate *P. aconitifolius*

Pods hairy :

Seeds black, oblong ; pods long-hairy *P. mungo*

Seeds usually green, nearly globular ; pods short-hairy

. *P. aureus*

Stipules basifixed; pods compressed:
 Pods broad, scimitar-shaped
 Pods linear, straight

P. limatus
P. vulgaris

P. trilobus Ait. Hort. Kew. 3: 30, 1789; FBI. 2: 201; FUGP. 1: 224.

A trailing, glabrous or hairy herb. Stipules oval. Leaflets 3, entire or deeply 3-lobed, the lobes rounded and broad. Flowers yellow, in capitate racemes. Pods 3-6 x 0.3 cm., subcylindric.

Found on the Ridge and in the plains on sandy soil or on roadsides during the monsoon period.

Local name: Chawla

Flowers and Fruits: Sept.-Nov.

J. K. Maheshwari 1096, University Campus; 1287

P. aconitifolius Jacq. Obs. 3: 2, t. 52, 1768; FBI. 2: 202; Duthie & Fuller, Field & Gard. Crops 1: 41, t. 11.

A diffuse, erect or scandent, hairy annual. Stipules inserted above their bases, small, lanceolate. Leaflets 2 to 7-lobed in the upper part or deeply 3-lobed, the lobes narrow and long. Flowers yellow, arranged in heads on axillary peduncles. Pods straight, cylindrical, torulose, smooth.

Grown as a rainy season crop, often mixed with Bajra on damp, yellowish-brown, sandy soil. The grain is an article of human and cattle food.

Local name: Moth; English name: Moth bean

Flowers and Fruits: July-Oct.

J. K. Maheshwari 187, Azadpur; 1315, Najafgarh

P. mungo Linn. Mant. 101, 1767; FBI. 2: 203; FUGP. 1: 226.

A trailing, hairy annual. Flowers yellow. Pods hairy, nearly erect, terete. Seeds usually black, sometimes greenish.

Grown as a mixed crop in fields of Jowar and Bajra.

Local name: Urd; English name: Black gram

Flowers and Fruits: Rainy season

P. aureus Roxb. Hort. Beng. 55, 1814, nom. nud. & Fl. Ind. 3: 297, 1832; Bailey, Man. Cult. Pl. 575.

P. mungo auct. (non Linn.).

P. radiatus auct. (non Linn.).

A much-branched, suberect, hirsute annual. Stipules conspicuous. Leaves dark green. Leaflets roundish, deltoid or rounded at the base. Flowers yellow, in capitate racemes. Pods clothed with long, silky hairs. Seeds usually green.

Cultivated as a rainy season crop, often mixed with other edible legumes, in fields of Gaiwar, Bajra, Jowar, cotton, etc. The grain is much eaten in the area as a 'dal'.

Local name : Mung

Flowers and Fruits : Sept.-Oct.

J. K. Maheshwari 1298, Vallabgarh

P. lunatus Linn. Sp. Pl. 724, 1753 ; FBI. 2 : 200 ; FUGP. 1 : 224.

A tall, twining plant. Flowers greenish-yellow. Pods 5-8 x 1.5 cm., flat, sharply beaked. Seeds thin, white or mottled.

Cultivated for the young pods which are used as vegetable.

P. vulgaris Linn. Sp. Pl. 723, 1753 ; FBI. 2 : 200 ; FUGP. 1 : 224.

A suberect or twining, glabrous annual. Flowers white, rose or lilac. Pods 10-15 x 1.3-1.6 cm., linear, straight, glabrous.

Cultivated for its tender pods which are used as vegetable. It is available in the market from February to April.

Local name : Vilaiti sem ; English name : Faraz bean

33. *Vigna Savi*

V. sinensis (Linn.) Savi ex Hassk. Cat. Hort. Bogor. 279, 1844 ; Santapau in RBSL 16(1) : 80, 1953.

Dolichos sinensis Linn. Cent. Pl. 2 : 28, 1756.

Vigna catjang Walp. in Linnaea 13 : 533, 1839 ; FBI. 2 : 205 ; FUGP. 1 : 227.

A suberect or twining annual. Leaflets 3, entire or slightly lobed. Flowers yellow or reddish. Pods linear, subtorulose.

Cultivated during the rainy season for its grain ; often mixed with millets and other crops.

Local name : Lobia ; Rawas

Flowers and Fruits : June-Oct.

J. K. Maheshwari 188, Azadpur

34. *Rhynchosia* Lour. nom. cons.

Glabrescent herbs ; seeds non-strophiolate *R. minima*

Hairy herbs ; seeds strophiolate *R. capitata*

R. minima (Linn.) DC. Prodr. 2 : 385, 1825 ; FBI. 2 : 223 ; FUGP. 1 : 222.

Dolichos minimus Linn. Sp. Pl. 726, 1753.

A spreading or twining, glabrous, slender annual. Leaflets 3, deltoid at the base, minutely yellow gland-dotted beneath. Flowers yellow, in lax racemes. Pods 1-2 x 0.5 cm., usually 2-seeded.

Common during the rains. In the absence of proper support, it spreads on the ground. On the Ridge it twines around herbs, shrubs and trees.

Flowers and Fruits : May-Nov.

J. K. Maheshwari 321

R. capitata DC. Prodr. 2 : 386, 1825 ; FUGP. 1 : 222.

R. aurea DC. Prodr. 3 : 386, 1828 ; FBI. 2 : 221, in part.

A trailing herb. Stems hairy. Leaflets 3, variable in shape, minutely gland-dotted beneath. Flowers yellow, in many-flowered racemes which become twisted and form heads of flowers, about 1.5×1.5 cm. Pods subcompressed, with transverse wrinkles, clothed with spreading hairs. Seeds 2.

Common near Najafgarh village in fallow and cultivated fields on damp, sandy soil. Serves as fodder.

Local name : Papro ; Papra

Flowers and Fruits : Sept.-Nov.

J. K. Maheshwari 1316, Najafgarh

35. *Atylosia* Wt. & Arn.

A. elongata Benth. in Miq. Pl. Jungh. 243, 1851 ; FBI. 2 : 215.

A herbaceous twiner, clothed with fine, spreading hairs. Leaflets 3, narrowed from the middle to a rounded base, pointed. Flowers long-peduncled. Pods oblong.

Found rarely in the area.

Flowers : Aug.-Sept.

J. K. Maheshwari 409, University Campus

36. *Cajanus* DC. nom. cons.

C. cajan (Linn.) Millsp. in Field Columb. Mus. Bot. 2 : 53, 1900 ; Merr. Enum. 2 : 314 ; Santapau in RBSI. 16(1) : 88, 1953.

Cytisus cajan Linn. Sp. Pl. 739, 1753.

Cajanus indicus Spreng. Syst. 3 : 248, 1826 ; FBI. 2 : 217 ; FUGP. 1 : 213.

An erect shrub, 1.5-2.4 m. high. Leaflets 3, oblong-lanceolate. Flowers yellow, in corymbose racemes. Pods narrowed at the ends, torulose.

The two varieties known locally as Thuar and Arhar are cultivated as cold season crops, often mixed with *Sorghum vulgare* Pers. and *Pennisetum typhoides* Stapf & C. E. Hubb.

Local name : Arhar ; Thuar

Flowers and Fruits : Nov.-July

J. K. Maheshwari 190, Azadpur ; 1085

37. *Derris* Lour. nom. cons.

D. scandens (Roxb.) Benth. in JLS. 4 (Suppl.) : 103, 1860 ; FBI. 2 : 240 ; FUGP. 1 : 268.

Dalbergia scandens Roxb. Pl. Cor. 2 : 49, t. 192, 1805.

A large, woody climber. Young parts rusty-pubescent. Branches pendulous. Leaflets 9-13. Flowers white, in long, axillary racemes. Pods thin, flat, indehiscent.

Grown as climber on walls ; gives a decorative appearance by its dark green, dense foliage.

Flowers : May-Sept. Fruits : Oct.-Dec.

J. K. Maheshwari 1107, Safdarjang Tomb Campus

38. *Pongamia* Vent. nom. cons.

P. pinnata (Linn.) Pierre, Fl. For. Cochinch. Sub t. 385, 1899, in obs. ; Santapau in RBSI. 16(1) : 86, 1953.

Cytisus pinnatus Linn. Sp. Pl. 741, 1753.

Pongamia glabra Vent. Jard. Malm. 28, t. 28, 1803 ; FBI. 2 : 240 ; FUGP. 1 : 267.

A moderate-sized, glabrous, deciduous tree. Bark soft, grey. Leaflets 2-3 pairs, variable in shape. Flowers lilac-rose or white tinged with violet or pink, in pendulous racemes. Calyx truncate, deep red. Pods thick, hard, 6-11.5 x 2-2.5 cm.

Planted in public and private gardens, near houses and along roadsides.

Local name : Papri

Flowers and Fruits : March-July

J. K. Maheshwari 231, Shahdara

39. *Dalbergia* Linn. f. nom. cons.

D. sissoo Roxb. Hort. Beng. 53, 1814, nom. nud. & Fl. Ind. 3 : 223, 1832 ; FBI. 2 : 231 ; FUGP. 1 : 264 ; Parker, For. Fl. 166.

A small or medium-sized tree. Bark grey. Leaflets 3-5, acuminate. Flowers yellowish-white. Pods 4-7 x 0.7-1 cm., strap-shaped, 1 to 3-seeded.

Planted along roadsides, in villages and introduced on the Ridge. Flowers appear suddenly and fruiting takes place in a short time.

Local name : Shisham

Flowers : March-June. Fruits : July-Aug.

J. K. Maheshwari 14 ; 967 ; 1086

40. *Sophora* Linn.

Leaflets oblong-orbicular ; flowers yellow *S. tomentosa*

Leaflets oblong-elliptic to subspathulate ; flowers violet-blue

. *S. secundiflora*

S. tomentosa Linn. Sp. Pl. 373, 1753 ; Merr. Enum. 2 : 270 ; Bor & Raiz. 50, Pl. 16.

An evergreen shrub. Leaflets 9-13, thick, obtuse or emarginate, shining above, $2.5-4 \times 2-3$ cm. Flowers sulphur-yellow, in terminal racemes. Calyx truncate. Pods hoary, the seeds separated by long seedless parts.

Cultivated in gardens around bungalows or in garden hedges.

Flowers : Dec.

J. K. Maheshwari 1053, St. Stephen's College Campus

S. secundiflora (Orteg.) Lag. ex DC. Cat. Hort. Monsp. 148, 1813 ; Parker, For. Fl. 169 ; Bor & Raiz. 51, f. 34, Pl. 17.

Broussonetia secundiflora Orteg. Nov. Rar. Pl. Matr. 61, t. 7, 1798.

A small, weak tree. Leaflets 7-9, sessile, coriaceous, $2.5-6 \times 1-2$ cm. Flowers in terminal, unilateral racemes. Pods woody, hoary, torulose, dull white. Seeds bright red, about 1 cm. long.

Introduced. A few trees are growing in the shrubbery of Rashtrapati Bhavan Campus.

Fruits : June

J. K. Maheshwari 692

Some trees of *Lonchocarpus speciosus* Bolus (JLS. 25 : 161, 1889) have been planted in Rashtrapati Bhavan Campus for their beautiful, sweet-scented, blue flowers.

38. Caesalpiniaceae

Leaves apparently simple, shallowly or deeply divided into 2 lobes *Bauhinia*

Leaves compound :

Leaf rachis ending in spine ; the rachilla long, flat, bearing numerous, small leaflets *Parkinsonia*

Rachis and rachilla not as above :

Leaflets two *Hardwickia*

Leaflets more than two :

Leaves once pinnate :

Thorny shrubs *Haematoxylon*

Unarmed herbs, shrubs or trees :

Petals absent ; calyx petaloid ; fertile stamens 2-8 *Saraca*

Petals present ; calyx not petaloid :

Petals 3 ; fertile stamens 3 *Tamarindus*

Petals 5 ; fertile stamens 5-10 *Cassia*

Leaves twice pinnate :

Sepals valvate or subvalvate ; stamens included *Delonix*

Sepals imbricate ; stamens exerted ;
Straggling or scandent shrubs ; pods armed

Erect shrubs ; pods unarmed *Caesalpinia*
Poinciana

Bauhinia Linn.

Shrubs or climbers :

A large, woody climber *B. vahlii*

A shrub ; flowers yellow *B. tomentosa*

Trees :

Calyx spathaceous *B. variegata*

Calyx splitting into 2, nearly equal, reflexed parts *B. purpurea*

B. vahlii Wt. & Arn. Prodr. 297, 1834 ; FBI. 2 : 279 ; FUGP. 1 : 299 ;
Bor & Raiz. 74, f. 48.

A massive, large-leaved climber. Young parts, petioles and inflorescences grey or rusty-pubescent. Leaves variable in size, up to 30×30 cm., deeply cordate or auriculate ; lobes obtuse. Flowers white, fading towards yellow, in corymbs or corymbose racemes. Pods $15-30 \times 2.5-5$ cm., flat, rusty-tomentose.

Planted in gardens. A large specimen is growing over an ancient gate in Qudsia Gardens. It has covered the walls of this gate and flowers in abundance. The flowering period is short and large number of flowers fall.

Flowers : May

J. K. Maheshwari 1338

B. tomentosa Linn. Sp. Pl. 375, 1753 ; FBI. 2 : 275 ; FUGP. 1 : 297 ;
Bor & Raiz. 68, f. 44.

A shrub. Leaves as long as broad or broader than long ; lobes obtuse. Flowers sulphur-yellow, usually in leaf-apposed pairs. Calyx spathaceous. Stamens 10. Pods $10-15 \times 1-1.4$ cm., finely pubescent.

Cultivated in hedges around bungalows and in public gardens.

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 471, Talkatora Gardens

B. variegata Linn. Sp. Pl. 375, 1753 ; FBI. 2 : 284 ; FUGP. 1 : 300 ;
Blatt. & Mill. Beaut. Ind. Tr. 4, t. 1.

A small or medium-sized tree. Leaves broader than long. Flowers pink to purple, large, fragrant, the lip often marked red or purple. Calyx spathaceous. Pods $10-25 \times 1.5-2$ cm., flat, glabrous, black.

Cultivated in lawns and gardens. The flowers appear on leafless branches.

Local name : Kachnar

Flowers : Feb-April. Fruits : July-Oct.

J. K. Maheshwari 1172, University Campus ; 1337, New Delhi

B. purpurea Linn. Sp. Pl. 375, 1753 ; FBL 2 : 284 ; FUGP. 1 : 300 ;
Blatt. & Mill. op. cit. 8.

A small or medium-sized tree. Young parts pubescent. Leaves longer than broad, 9 to 11-nerved ; lobes reaching near the middle, subacute. Flowers rose-coloured. Calyx limb usually splitting into 2 parts. Pods $15-30 \times 2-2.5$ cm.

Cultivated in lawns, private and public gardens.

Local name : Kachnar

Flowers : Sept.-Nov.

J. K. Maheshwari 1193, I.A.R.I.

Parkinsonia Linn.

P. aculeata Linn. Sp. Pl. 375, 1753 ; FBL 2 : 260 ; FUGP. 1 : 303 ;
Parker, For. Fl. 173.

A diffuse shrub or small tree, up to 5 m. tall, branching near the base. Spines sharp, woody. Rachis flattened, bearing minute, oblanceolate leaflets. Flowers yellow. Pods $6-9 \times 0.7$ cm., turgid, dry, moniliform, with elongated, seedless parts.

Grown in public gardens and lawns and in hedges for its elegant appearance. It has been introduced on the New Delhi Ridge near Kitchener Road where it flowers and fruits abundantly.

Local name : Vilayti kinar

Flowers : Nov.-Feb. Fruits : Summer season

J. K. Maheshwari 1073, Ridge ; 1339, University Campus

Hardwickia Roxb.

H. binata Roxb. Pl. Cor. 3 : 6, t. 209, 1811 ; Brandis, Ind. Tr. 250.

A large tree. Branchlets slender, drooping. Leaflets two, obtuse, obliquely ovate to trapezoid. Flowers greenish-yellow, in racemes forming a panicle. Pods $6-8 \times 1.3-1.5$ cm., flat, oblong, parallel-veined.

Planted in lawns and squares of New Delhi.

Fruits : July

J. K. Maheshwari 1138, Lawn near G Block, C.P.W.D., New Delhi

Haematoxylon Linn.

H. campechianum Linn. Sp. Pl. 384, 1753 ; Parker, For. Fl. 181 ; Benthall, Trees Calc. 185.

A thorny shrub. Stems grey, dotted. Leaves pinnate. Leaflets 2 to 5-paired, broad obovate to obovate-oblong. Flowers yellow, in

racemes. Pods $3.5 \times 0.8-1$ cm., straw-coloured; tapering at ends, 2 to 4-seeded.

Cultivated in hedges and lawns. It forms a nice hedge.

English name : Logwood

Fruits : April

J. K. Maheshwari 1110, Lodi Gardens

Saraca Linn.

S. indica Linn. Mant. 98, 1767 ; FBL 2 : 271 ; Benthall, Trees Calc. 178 ; Blatt. & Mill. Beaut. Ind. Tr. 130, t. 27.

Jonesia asoca Roxb. in As. Res. 4 : 355, 1795.

A small, evergreen tree, forming a dense crown. Leaflets 6-12, oblong or oblong-lanceolate, up to 30×8 cm. Flowers orange or orange-yellow, changing to vermillion, very fragrant, in dense corymbs, about 10 cm. broad, from the scars of fallen leaves. Calyx tubular, petaloid. Petals absent.

Planted in some gardens ; collected twice from Gulab Bagh, near Sabzimandi. The flowers, which are borne in great profusion, are extremely beautiful and delicately scented.

Local name : Ampich ; Ashok

Flowers : April

J. K. Maheshwari 1383

Tamarindus Linn.

T. indica Linn. Sp. Pl. 34, 1753 ; FBL 2 : 273 ; FUGP. 1 : 301 ; Parker, For. Fl. 182.

Middle-sized or large tree, with a dense crown. Leaflets 10 to 20-paired, oblong, 1.5×0.5 cm. Flowers yellow striped with red. Pods $8-15 \times 1.5-2$ cm., usually falcate, pulpy inside. Seeds dark brown, shining.

Commonly planted along the streets as an avenue tree and in gardens for its ornamental foliage and edible fruits. A beautiful avenue of tamarinds can be seen on Hardinge Road in New Delhi.

Local name : Imli ; Amla

Flowers : July-Aug. Fruits : Cold season

J. K. Maheshwari 211

Cassia Linn.

Herbs, undershrubs or shrubs :

Leaflets linear-terete ; a shrub *C. artemistoides*

Leaflets flat :

Leaf rachis without glands *C. obtusa*

Leaf rachis with a single gland at the base or between the lowest pair of leaflets :

Gland present between the lowest pair of leaflets . . . *C. tora*

Gland present at the base of petiole or rachis :

Fertile stamens 5 ; leaflets small, narrow, up to 1.3 cm. long ; gland stalked . . . *C. pumila*

Fertile stamens 7 ; leaflets more than 2.5 cm. long : . . . *C. occidentalis*

Leaflets 3-5 pairs . . . *C. sophora*

Leaflets 8-12 pairs . . .

Trees :

Bracts conspicuous, persistent ; three anther filaments with a globose swelling :

Leaflets 6-14 ; racemes lateral :

Leaflets pointed, glabrous . . . *C. nodosa*

Leaflets rounded, hairy beneath . . . *C. javanica*

Leaflets 8-20 pairs ; racemes from scars of fallen leaves . . .

. . . *C. renigera*

Bracts small, falling off before flowers ; anther filaments without globose swellings :

Stamens 10, all fertile :

Stamens nearly equal in length ; pods flat, dehiscent . . .

. . . *C. surattensis*

Stamens unequal ; pods very long, cylindric, indehiscent . . .

. . . *C. fistula*

Fertile stamens 6-7 . . .

. . . *C. siamea*

C. artemisioides Gaudich. ex DC. Prodr. 2 : 495, 1825 ; Bailey, Man. Cult. Pl. 586.

A bushy shrub, xerophytic-looking, with silky-grey pubescence throughout. Leaflets 3-6 pairs, narrowly linear, almost terete, 1.5-2.5 × 0.1 cm. Flowers sulphur-yellow, in axillary, corymbose racemes. Fertile stamens 10. Pods flat, 3-4.5 × 0.7 cm., shining brown.

Native of Australia. Cultivated for its fragrant, ornamental flowers.

Flowers : Jan.-March. Fruits : March-May

J. K. Maheshwari 245, Sunder Nursery ; 1225, I.A.R.I. (Botany Division)

C. obtusa Roxb. Hort. Beng. 31, 1814, nom. nud. ; Wt. Ic. t. 757, 1844 ; FUGP. 1 : 294.

C. obovata Collad. Hist. Cass. 92, t. 15, 1816 ; FBI. 2 : 264.

This plant was reported to occur near Delhi in the herbarium of Royle. I have not come across it in the field.

A diffuse herb, 30-120 cm. tall. Leaflets 4 to 6-paired, membranous. Flowers pale yellow, in narrow, few-flowered racemes. Pods much-curved, flexible, glabrous.

C. tora Linn. Sp. Pl. 376, 1753; FBI. 2: 263, in part; Santapau in RBSI. 16(1): 90, 1953.

C. obtusifolia Linn. Sp. Pl. 377, 1753.

A herb or undershrub. Leaflets 6, 3.5×2.5 cm., obovate-oblong, with a gland between the lowest pair. Flowers bright yellow. Stamens 7, the 3 upper reduced to staminodes. Pods $15-25 \times 0.4-0.6$ cm., stout, obliquely septate.

A common weed along roadsides or in open, waste places; often becoming aggressive on unused ground. Rare on the Ridge except near buildings. The seeds are said to be used in medicine and are also employed in the preparation of sweets.

Local name: Pawad; Chakowar

Flowers and Fruits: Aug.-Nov.

J. K. Maheshwari 78

C. pumila Lamk. Encycl. 1: 651, 1785; FBI. 2: 266; FUGP. 1: 295.

A prostrate, ascending or suberect, deep-rooted, stout herb. Stems and branches often reddish-brown. Leaflets 10-20 pairs, linear-oblong, a stipitate gland present at the base of pinna. Flowers yellow, usually solitary. Pods $2.5-4 \times 0.5$ cm., straight, flat, torulose. Seeds rectangular, polished.

Common on the Ridge and in crevices of rocks, shade of trees and shrubs and in the open gravelly soils. Also found in open plains on damp, sandy soil, often hidden amongst grasses.

Flowers and Fruits: Sept.-Oct.

J. K. Maheshwari 425

C. occidentalis Linn. Sp. Pl. 377, 1753; FBI. 2: 262; FUGP. 1: 292; Parker, For. Fl. 175.

An undershrub, 0.6-1.5 m. tall. Leaves with an ovoid gland at base of the petiole. Leaflets 3-5 pairs, ovate-oblong or oblanceolate. Flowers yellow, in corymbiform, axillary clusters. Fertile stamens 6-7. Pods $9-13 \times 0.8$ cm., transversely partitioned. Seeds 20-30, pale brown.

Common along roadsides, amongst hedges of gardens and in waste places. The plant attracts large number of ants due to nectar secreted by petiolar glands.

Local name: Ban bhates; Dhadial

Flowers and Fruits: June-Nov.

J. K. Maheshwari 294

C. sophora Linn. Sp. Pl. 379, 1753; FBI. 2: 262; FUGP. 1: 293.

A shrubby herb. Leaflets 8-12 pairs, oblong-lanceolate, acute or tapering; rachis with a single gland at base. Flowers yellow, in corymbose racemes. Pods slightly curved, transversely septate.

Commonly planted as a hedge around bungalows.

Local name : Kasundi
 Flowers and Fruits : July-Feb.
 J. K. Maheshwari 731 ; 801

C. nodosa Buch.-Ham. ex Roxb. Hort. Beng. 31, 1814, nom. nud. & Fl. Ind. 2 : 336, 1832 ; FBI. 2 : 261 ; Blatt. & Mill. Beaut. Ind. Tr. 29.

A small or medium-sized, evergreen tree with a short gnarled trunk and fine spreading crown. Bark reddish-brown or ash-coloured. Flowers and leaves contemporary. Leaflets 10-14, oblong. Flowers pink fading to dull white, showy, in racemes. Bracts pinkish-green, acuminate. Pods cylindrical, 30-45 cm. long.

Planted in the lawns of gardens for its ornamental flowers and foliage.

Flowers : May-Aug.
 J. K. Maheshwari 774

C. javanica Linn. Sp. Pl. 379, 1753 ; Blatt. & Mill. op. cit. 27, t. 4.

A medium-sized tree. Leaflets 12-20. Flowers and leaves together, pink fading to white. Sepals red. Stamens 10, three with swelling.

Planted in gardens.

Flowers : June

J. K. Maheshwari 691, Rashtrapati Bhavan Campus

C. renigera Wall. Cat. 5307, 1831-2, nom. nud. ; Benth. in TLS. 27 : 518, 1871 ; FBI. 2 : 262 ; Blatt. & Mill. op. cit. 35, t. 5.

Flowers in racemes, on leafless branches. Sepals red. Stamens 10. Pods smooth.

Planted in gardens.

Flowers : May-June

C. surattensis Burm. f. Fl. Ind. 97, 1768.

C. glauca Lamk. Encycl. 1 : 647, 1785 ; FBI. 2 : 265 (excl. syn. *C. fastigiata* Vahl) ; FUGP. 1 : 292.

A small tree. Leaflets 4-6 pairs, pale green. Flowers yellow, in axillary corymbs. Stamens 10, nearly equal. Pods straight, flat, thin.

Planted as a hedge in gardens.

Flowers : Sept.-Oct.

C. fistula Linn. Sp. Pl. 377, 1753 ; FBI. 2 : 261 ; FUGP. 1 : 291 ; Blatt. & Mill. op. cit. 19, t. 3.

A moderate-sized, deciduous tree with thick, yellowish or greenish-grey bark. Leaflets 4-8 pairs, 10-15 × 5 cm. Flowers bright yellow, in long, drooping, lax racemes. Pods 30-60 × 2-2.5 cm., cylindrical, pendulous among leafless branches. Seeds flat, embedded in sweetish pulp.

Occurs in a semiwild condition on the Ridge. Cultivated in gardens, lawns and squares. A beautiful avenue of this tree can be seen on Minto Road. The fruits are medicinal.

Local name : Amaltas

Flowers : April-July. Fruits : Oct.

J. K. Maheshwari 18, Ridge Road ; 509, Kingsway Camp Gardens
C. slamea Lamk. Encycl. 1 : 648, 1785 ; FBI. 2 : 264 ; Bailey, Man. Cult. Pl. 586.

A moderate-sized or large tree. Bark grey. Leaves paripinnate, eglandular. Leaflets 12-24, oblong. Flowers yellow, in corymbose racemes clustered at the ends of branches. Fertile stamens 6-7. Pods nearly straight, flat, $20-30 \times 1.5$ cm., with thickened sutures.

Cultivated in gardens for ornamental purposes and also used in avenues.

Flowers : Summer

J. K. Maheshwari 661, Talkatora Gardens

The following species have also been reported under cultivation within the area but have not been noticed by me.

C. didymobotrya Fresen. in Flora 22 : 53, 1839 ; Rock, Legum. Pl. Hawaii 83, t. 33.

C. roxburghii DC. Prodr. 2 : 489, 1825 ; Blatt. & Mill. op. cit. 33.

C. marginata Roxb. Hort. Beng. 31, 1814, nom. nud. & Fl. Ind. 2 : 338, 1832 ; FBI. 2 : 262.

C. corymbosa Lamk. Encycl. 1 : 644, 1785 ; Bailey, Man. Cult. Pl. 587.

C. eremophila A. Cunn. ex Vog. Syn. Cass. 47, 1837.

C. floribunda Cav. Descr. 132, 1802 ; Wit in Webbia 11 : 245, 1955.

C. laevigata Willd. Enum. Hort. Berol. 441, 1809.

Delonix Raf.

D. regia (Boj.) Raf. Fl. Tell. 2 : 92, 1836 ; Benthall, Trees Calc. 170 ; Blatt. & Mill. Beaut. Ind. Tr. 52, t. 10.

Poinciana regia Boj. ex Hook. in Bot. Mag. t. 2884, 1829 ; FBI. 2 : 260.

A magnificent tree with an umbrella-shaped crown. Leaves bipinnate, feathery, 60 cm. long. Leaflets about 1.2×0.5 cm. Flowers red or orange-red. Pods $30-60 \times 5$ cm., flat. Seeds numerous, oblong.

Commonly planted in gardens, squares and avenues for ornamental purposes and for the shade given by its dense foliage. The flowering period is irregular, almost throughout the year. The tree often produces vegetative buds after the first few showers.

Local name : Gul-mohor
 Flowers : April-Sept. Fruits : Nov.-April
 J. K. Maheshwari 1340, University Campus

Cnesulpinia Linn.

C. crista Linn. Sp. Pl. 380, 1753.

C. bonduc Roxb. Hort. Beng. 32, 1814, nom. nud. & Fl. Ind. 2 : 362, 1832.

C. bonducella Flem. in As. Res. 11 : 159, 1810 ; FBI. 2 : 254 ; FUGP. 1 : 302.

A scandent or straggling, prickly shrub. Prickles hook-like. Pinnae 6-8 pairs. Leaflets 6-10 pairs, oblong-ovate. Bracts caducous. Flowers yellow, spotted with red or not. Pods 5-8 x 4-5 cm., short-oblong, thickly armed with sharp, wiry prickles. Seeds 2, polished, lead-coloured. Planted along the boundaries of gardens. It makes an effective hedge. In teratological specimens the inflorescence axis becomes fasciated and bears abnormal flowers.

Local name : Karkonda ; English name : Fever-nut

Flowers and Fruits : Sept.-Oct.

J. K. Maheshwari 465, Talkatora Gardens

Poinciana Linn.

P. pulcherrima Linn. Sp. Pl. 380, 1753 ; Bailey, Man. Cult. Pl. 589.

Caesalpinia pulcherrima Sw. Obs. 166, 1791.

A glabrous, handsome shrub, up to 3 m. tall. Branches prickly, lenticellate. Pinnae 8-16. Leaflets oblique-oblong. Flowers variously coloured in red and orange, long-peduncled, in large, loose, terminal or axillary racemes. Pods thin, broadly linear.

Said to have been introduced from America. Cultivated for hedges and in lawns and garden shrubberies.

Local name : Gul-mohar

Flowers and Fruits : April-Dec.

J. K. Maheshwari 469, Talkatora Gardens

39. Mimosaceae

Tribe 1. *Adenanthereae*. Stamens definite, anthers gland-tipped.
 Flowers all bisexual

Upper flowers of spikes bisexual, the lower neuter *Prosopis*

Tribe 2. *Mimoseae*. Stamens definite, anthers not gland-tipped.
 Pods continuous, opening through the sutures *Dichrostachys*

Pods jointed, sutures persistent *Leucaena*

. *Mimosa*

Tribe 3. *Acacieae*. Stamens indefinite.
Stamens free; flowers in spikes or globose heads

Tribe 4. *Ingeae*. Stamens indefinite, monadelphous.
Pods straight
Pods curved or twisted

*Acacia**Albizzia*
*Pithecellobium**Prosopis* Linn.

Prickles small, conical; leaflets 1.2 cm. long or less; pods cylindrical

Thorns large, subulate; leaflets 1.8-3.8 cm. long; pods compressed *P. spicigera*

Armed with thorns or unarmed; leaflets 0.5-2 cm. long; pods compressed *P. glandulosa*

P. juliflora

P. spicigera Linn. Mant. 68, 1767; FBI. 2: 288; FUGP. 1: 309;
Parker, For. Fl. 198; Bor, Man. Ind. For. Bot. 76.

A middle-sized, glabrous tree, armed with short, straight prickles.
Bark grey, rough with deep fissures or cracks. Pinnae usually 2 pairs with
a gland between each pair. Leaflets 8-10 pairs, 0.5-1.2 x 0.4 cm., obliquely
oblong. Flowers yellow, in slender spikes. Pods 8-16 x 0.5-1 cm.,
pendulous, torulose, subtorulose or flattish, thick.

Common on the Ridge, easily recognized by its characteristic habit,
dark green, dull foliage and flowers in lax spikes. It usually produces
conspicuous insect galls on leaf rachis and petiole.

Local name: Janti; Chonkra

Flowers: May-Aug. Fruits: June

J. K. Maheshwari 1075, Kitchener Road, Ridge

P. glandulosa Torr. in Ann. Lyc. N. York 2: 192, 1828; Parker, For.
Fl. 199; Bor, loc. cit.

P. juliflora DC. var. *glandulosa* Cock. in N. Mex. Agr. Expt. Sta. Bull.
15: 58, 1895.

A large shrub or small tree with straggling or pendulous branches.
Spines stout. Pinnae 1-2 pairs. Leaflets 10-18, rather distant, linear-
oblong. Flowers creamy-yellow, in axillary spikes. Pods 13-20 x 0.8
cm., linear, straight or falcate, beaked.

Introduced on the Ridge where it grows well. It is less common
than *P. juliflora*.

Flowers and Fruits: April-June

J. K. Maheshwari 1426, Old Delhi Ridge

P. juliflora (Sw.) DC. Prodr. 2: 447, 1825; Parker, For. Fl. 200.

Mimosa juliflora Sw. Prodr. 85, 1788.

A small or moderate-sized, drought-resistant tree with drooping bran-

ches and spreading crown. Pinnae usually 4. Leaflets 17-20 pairs, obliquely oblong. Flowers cream-coloured or yellow, in hanging spikes. Pods $12.5-25 \times 1-1.5$ cm., pendulous, curved and torulose; pulp sweetish. Seeds brown.

Native of arid regions of Mexico and Central America. It was introduced on the Ridge by the Horticultural Department. Now it is abundant throughout the district and has been commonly planted as a hedge and as a shade plant in the rural areas. It can spread well on arid barren ground. The sweetish pulp inside the pods is eaten in times of scarcity. It flowers twice a year.

Local name : Kabuli kihar
Flowers : April-Sept. Fruits : Oct.
J. K. Maheshwari 1343, Ridge

Several forms of *P. juliflora* have been introduced in the arid zones of India. I came across the following ones on the Ridge. Other forms are also likely to occur because differences in pod features and foliage have been noted.

P. juliflora DC var. *velutina* (Wooton) Sarg. Silv. N. Amer. 13 : 15, 1902.
P. velutina Wooton in Bull. Torrey Bot. Cl. 25 : 456, 1898.
Leaves and inflorescences densely tomentose.

P. juliflora DC.-Mexican form.

Pods indistinctly and interruptedly beaded; beak stout, straight or somewhat sickle-shaped.

Dichrostachys (DC.) Wt. & Arn. nom. cons.

D. cinerea (Linn.) Wt. & Arn. Prodr. 271, 1834; FBI. 2 : 288;
FUGP. 1 : 310.

Mimosa cinerea Linn. Sp. Pl. 517, 1753.

A large, branched shrub or small tree, resembling an *Acacia* in vegetative condition. Branchlets ending in spines. Bark white, grey or light brown. Leaves paripinnate, with stipitate glands at the base of each pair. Leaflets 12-15 pairs. Flowers small, in beautiful spikes; upper ones fertile and yellow; lower ones sterile, with rose-coloured staminodes. Pods curled, twisted, irregularly dehiscent.

Common on the New Delhi Ridge in dry, rocky places. Rare on the Ridge near University.

Flowers and Fruits : Sept.

J. K. Maheshwari 214, New Delhi Ridge

Leucaena Benth.

L. leucocephala (Lamk.) Wit in Taxon 10 : 53, 1961, in obs.

Mimosa leucocephala Lamk. Encycl. 1 : 12, 1783.

Leucaena glauca Benth. in Hook. Lond. Jour. Bot. 4 : 416, 1842 ;
FBI. 2 : 290 ; FUGP. 1 : 310.

A shrub or small tree. Pinnae 4-8 pairs. Leaflets 10-15 pairs, linear, clustered in umbels, linear, flat, shining. Pods 12-16 \times 1-1.5 cm., cultivated in hedges and along boundaries of fields.

Flowers : Rainy season

J. K. Maheshwari 467, Talkatora Gardens

Mimosa Linn.

Spreading herbs or undershrubs ; pinnae digitately arranged . *M. pudica*
Erect or straggling shrubs ; pinnae pinnately arranged :

Pods with prickly sutures

Pods usually not prickly *M. hamata*

M. pudica Linn. Sp. Pl. 518, 1753 ; FBI. 2 : 291 ; FUGP. 1 : 311.

A spreading, diffuse undershrub. Stems and branches prickly and bristly. Leaves very sensitive. Pinnae 4. Leaflets 12-20 pairs. Flowers purplish, in oblong-globular heads. Pods flat, 3 to 5-jointed, membranous ; margins spinose-bristly.

Cultivated in gardens and nurseries or as a pot plant.

Local name : Lajwanti ; Chui-mui

Flowers and Fruits : Aug.-Nov.

J. K. Maheshwari 358, University Gardens

M. hamata Willd. Sp. Pl. 4 : 1033, 1806 ; FBI. 2 : 291 ; FUGP. 1 : 312 ;
Parker, For. Fl. 196.

An erect, diffuse or straggling shrub, prickly throughout. Pinnae 3-5 pairs. Leaflets 6-10 pairs. Flowers red. Pods 4-8 \times 1 cm., flat, curved, prickly at the edges and on the stalk, 4 to 8-jointed.

Common all over the New Delhi Ridge, often in association with other thorny shrubs of the area. Not so common on the Ridge near the University.

Flowers and Fruits : Sept.-Oct.

J. K. Maheshwari 470, New Delhi Ridge

M. rubicaulis Lamk. Encycl. 1 : 20, 1783 ; FBI. 2 : 291 ; FUGP. 1 : 311 ;
Parker, For. Fl. 196.

An erect or straggling shrub. Prickles throughout on stems, branches and leaf rachis, recurved. Pinnae 8-12 pairs. Leaflets 8-12 pairs. Flowers rose-coloured, fading to white, in solitary or fascicled heads. Pods oblong-linear, curved, glabrous, sometimes prickly on the margins.

Commonly grown as a hedge around gardens and fields and along small water channels in the villages.

Local name : Aal ; Chakur
 Flowers and Fruits : June-Sept.
 J. K. Maheshwari 119, Azadpur

Acacia Willd.

1. Flowers in globose heads, not forming a panicle ; spines long, straight ;
 2. Pods thick, cylindric, black, pulpy inside *A. farnesiana*
2. Pods flat, moniliform, with deep sutures between the seeds *A. arabica*
2. Pods thin, flat, straight *A. jacquemontii*
1. Flowers in globose heads, forming a terminal panicle *A. leucophloea*
1. Flowers in cylindric spikes : *A. auriculiformis*
3. Leaves reduced to phyllodia *A. auriculiformis*
3. Leaves bipinnate : *A. modesta*
4. Stipular spines 2 ; pinnae 2-3 pairs *A. modesta*
4. Stipular spines 2 ; pinnae about 20 pairs ; leaflets numerous *A. catechu*
4. Stipular spines 3 ; pinnae 3-5 pairs ; leaflets 8-14 pairs *A. senegal*

A. farnesiana (Linn.) Willd. Sp. Pl. 4 : 1083, 1806 ; FBI. 2 : 292 ; FUGP. 1 : 313 ; Parker, For. Fl. 189.

Mimosa farnesiana Linn. Sp. Pl. 521, 1753.

A shrub or small, stunted tree. Stems grey. Spines straight, often paired, 0.5-1.4 cm. long. Pinnae 2-7 pairs. Leaflets small. Flowers golden-yellow, very fragrant, in axillary, fascicled heads. Pods 3.6-7 × 1.2 cm., thick, cylindrical, hooked at the tip, pulpy inside.

Cultivated for hedges around gardens and fields.

Local name : Vilaiti babul

Flowers : Jan.-April. Fruits : April-May

J. K. Maheshwari 1021, Azadpur ; 1329 ; 1342, Kingsway Camp

A. arabica Willd. Sp. Pl. 4 : 1085, 1806 ; FBI. 2 : 293 ; FUGP. 1 : 314 ; Parker, For. Fl. 189.

A small or medium-sized tree, branching high above the ground. Bark dull black. Branches reddish-brown. Spines white, straight, 3-7 cm. long. Pinnae 2-6 pairs. Leaflets 10-20 pairs, 6 × 1 mm. Flowers yellow, fragrant, in axillary, fascicled heads. Pods 8-15 × 1.2 cm., flat, moniliform, with deep sutures between the seeds.

Commonly planted throughout the district along canal banks and in the fields. Leaves and young pods are used as fodder. The birds, especially crows, eat away the seeds from the pods which fall on the ground. These are picked up and given as fodder to goats and other animals. The twigs are chewed and used as tooth-brushes.

Local name : Desi babul ; Babul ; Kikar
 Flowers : Rainy season. Fruits : Cold and summer seasons
 J. K. Maheshwari 217, Timarpur ; 1341, Okhla Road

A. jacquemontii Benth. in Hook. Lond. Jour. Bot. 1 : 499, 1842 ; FBI. 2 : 293 ; FUGP. 1 : 314.
 A shrub or small tree. Spines straight, 0.5-3 cm. long, white at maturity. Leaflets 6-10 pairs. Flowers pale yellow, in axillary, fascicled heads. Pods 5-8 cm. long, flat, thin, straight.

Planted as a hedge around gardens in Azadpur and neighbouring areas.

Local name : Kikar
 Flowers : Cold season

A. leucophloea (Roxb.) Willd. Sp. Pl. 4 : 1083, 1806 ; FBI. 2 : 294 ; FUGP. 1 : 315 ; Parker, For. Fl. 191.

Mimosa leucophloea Roxb. Pl. Cor. 2 : 27, t. 150, 1800.

A small or medium-sized, deciduous tree. Bark white-grey. Spines short, straight. Pinnae 5-12 pairs. Leaflets 10-30 pairs, linear, crowded, about 5 × 1 mm. Flower heads small, pale yellow, sweet-scented, in large, terminal, leafless, densely tomentose panicles. Pods 10-15 × 0.6-1 cm., narrowly ligulate, with persistent, pale brown tomentum.

A characteristic tree of the hilly tracts of Delhi. Common on the Ridge. The leaves are eaten as fodder by goats. The flowers give a sweet scent at dusk. Fungus galls of *Haplophragmium* and insect galls occur on the tree. The pods are said to be poisonous and cattle may die after eating them.

Local name : Ronj ; Jand
 Flowers : Sept.-Oct. Fruits : Nov.-Feb.
 J. K. Maheshwari 461, Ridge

A. auriculiformis A. Cunn. in Hook. Lond. Jour. Bot. 1 : 377, 1842.

A medium-sized tree. Phyllodia curved, coriaceous, parallel-nerved, tapering at the ends. Flowers yellow, in cylindrical, lax spikes. Pods moniliform, brown, coiled at maturity, dehiscent.

Cultivated in lawns and as avenues in the side-lanes of New Delhi for its graceful, pendent phyllodes and beautiful flowers.

Flowers : Oct. Fruits : Aug. ; Nov. (next year)
 J. K. Maheshwari 526, Lodi Gardens ; 708, Talkatora Gardens

A. modesta Wall. Pl. As. Rar. 2 : 27, t. 130, 1831 ; FBI. 2 : 296 ; FUGP. 1 : 317 ; Parker, For. Fl. 193.

A small or medium-sized tree, branching from base. Bark dull black. Leaflets 3-5 pairs, 8-10 × 5-7 mm., obliquely oblong or obovate. Young foliage reddish. Flowers white, in cylindrical, drooping spikes. Pods 4-11 × 1-1.5 cm., oblong, flat, entire or subtorulose.

Common throughout the Ridge. The young twigs possess a sweetish sap and are chewed for use as tooth-brushes. The sap from the twigs is said to prevent diseases of teeth.

Local name : Phulahi

Flowers : July-Sept. Fruits : July-Oct.

J. K. Maheshwari 216, New Delhi Ridge

A. catechu Willd. Sp. Pl. 4 : 1079, 1806 ; FBI. 2 : 295 ; FUGP. 1 : 316.

A small, weak tree. Bark grey-white to dull black, peeling off in longitudinal flakes. Spines paired, hooked. Pinnae about 20 pairs or more. Leaflets numerous, 5×1 mm. Flower buds purplish, in cylindrical spikes. Flowers white, fragrant, fading towards pale brown. Pods 5-7.5 cm. long, stalked, torulose, dehiscent, dark brown.

Found in the hilly tracts of Delhi, especially on the Ridge. Occurs less commonly on the Ridge as compared to other species of *Acacia*. Differs from the closely allied *A. chundra* (Roxb.) Willd., by its pubescent leaf rachis, calyx and corolla.

Flowers and Fruits : July-Aug.

J. K. Maheshwari 181, New Delhi Ridge

A. senegal Willd. Sp. Pl. 4 : 1077, 1806 ; FBI. 2 : 295 ; FUGP. 1 : 317.

A small tree, branching from near the base. Trunk greyish-yellow. Spines usually in threes, hooked or straight. Pinnae 3-5 pairs. Leaflets 8-14 pairs. Flowers white, fragrant, fading to dull yellow, in cylindrical, 5-12 cm. long spikes. Pods $5.9 \times 2.2.5$ cm., dehiscent, flat, straight, grey. Seeds brown, orbicular.

Common throughout the Ridge.

Flowers : July-Sept. Fruits : Post-monsoon and cold seasons

J. K. Maheshwari 1122, Ridge

The following species were collected by W. R. Mustoe, Superintendent, Govt. Horticultural Department, Delhi, and sent to Forest Research Institute Herbarium, Dehra Dun. I have not come across them during my collection trips.

† *A. polyacantha* Willd. Sp. Pl. 4 : 1079, 1806.

A. nama Buch.-Ham. ex Voigt, Hort. Suburb. Calc. 260, 1845 ; FBI. 2 : 294.

Locality : Delhi Ridge, cultivated

Collector : Mustoe, 1924

A. ferruginea DC. Prodr. 2 : 458, 1825 ; FBI. 2 : 295.

Locality : Ridge, cultivated

Collector : Parker, Feb. 1923 ; Mustoe, 1924

= *A. repens*

United with
A. catechu

(Philippine)

MIMOSACEAE

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A. confusa Merr. in Philip. Jour. Sci. (Bot.) 5 : 27, 1910.
Locality : Delhi, cultivated
Collector : Mustoe, August 1923

A. horrida Willd. Sp. Pl. 4 : 1082, 1806. = *A. latronum*
Locality : Delhi Ridge, cultivated
Collector : Parker, Feb. 1923 ; Mustoe, 1924

Albizia Durazz.

Pods straw-coloured ; flowers stalked

Pods brown or reddish-brown ; flowers sessile : *A. lebbeck*

Midrib of leaflets nearer the upper edge

Midrib of leaflets near the lower edge *A. odoratissima*

Pods reddish-brown ; flowers shortly pedicelled ; midrib of leaflets central *A. procera*

. *A. amara*

A. lebbeck (Linn.) Benth. in Hook. Lond. Jour. Bot. 3 : 87, 1844 ;
FBI. 2 : 298 ; FUGP. 1 : 320 ; Parker, For. Fl. 186.
Mimosa lebbeck Linn. Sp. Pl. 516, 1753.

A medium-sized or large, deciduous tree. Trunk grey. Leaves paripinnate, with a large gland at base. Pinnae 2-3 pairs. Leaflets 5-10 pairs, 3-5 × 1.5-2 cm. Flowers pale yellow, scented, in heads. Pods 10-30 × 3-5 cm., straw-coloured, with pale brown patches, flat, dry.

Commonly planted in avenues on the Bhagwandas and Shahdara Roads. Introduced on the Ridge where it flowers and fruits.

Local name : Siras

Flowers : April-July. Fruits : Sept.

J. K. Maheshwari 233

A. odoratissima (Linn. f.) Benth. in Hook. Lond. Jour. Bot. 3 : 88, 1844 ;
FBI. 2 : 299 ; FUGP. 1 : 321 ; Parker, For. Fl. 185.
Mimosa odoratissima Linn. f. Suppl. 437, 1781.

A tall, erect tree. Bark dark grey. Leaves bipinnate. Pinnae 3-4 pairs. Leaflets 8-20 ; midrib near the upper edge. Flowers yellowish-white. Pods 16-20 × 2.5 cm., thin, flexible, reddish-brown.

Cultivated along the roadsides.

Local name : Siris

Fruits : Nov.

A. procera (Roxb.) Benth. in Hook. Lond. Jour. Bot. 3 : 89, 1844 ; FBI. 2 : 299 ; FUGP. 1 : 321 ; Parker, For. Fl. 187.

Mimosa procera Roxb. Pl. Cor. 2 : 12, t. 121, 1799.

A tall tree. Bark yellowish- or greenish-white. Leaves bipinnate, with a large gland at the base. Pinnae 2-6 pairs. Flowers yellowish-white, in small heads. Pods 10-20 × 1.8 cm., reddish-brown, shining.

Planted along streets and in lawns. The reddish-brown pods are conspicuous on the tree during the cold season.

Local name : Siras

Flowers : July-Aug. Fruits : Cold season

J. K. Maheshwari 1362, University Campus

A. amara Boivin in Encycl. 19 Siècle 2 : 34 ; Benth. in Hook. Lond. Jour. Bot. 3 : 90, 1844 ; Brandis, Ind. Tr. 272.

A medium-sized tree. Pinnæ 6-15. Leaflets numerous, very small, closely set, 5-8 × 2 mm. Flowers yellow, fragrant. Pods flat, dry, yellow, 10-15 × 2.5 cm.

Cultivated in lawns, gardens and along streets. Some trees have been planted on the Ridge.

Flowers : July-Sept. Fruits : Nov.-Dec.

J. K. Maheshwari 1271, Old Delhi Ridge

Pithecellobium Mart. nom. cons.

P. dulce (Roxb.) Benth. in Hook. Lond. Jour. Bot. 3 : 199, 1844 ; F.B.I. 2 : 302 ; FUGP. 1 : 322 ; Benthall, Trees Calc. 222.

Mimosa dulcis Roxb. Pl. Cor. 1 : 67, t. 99, 1798.

Inga dulcis Willd. Sp. Pl. 4 : 1005, 1806.

A large, thorny tree. Bark grey-white or slate-coloured. Leaves twice pinnate. Pinnæ 2. Leaflets 2, obovate or elliptic-oblong. Flowers white, in globose, axillary heads. Pods spirally twisted, reddish-brown.

Cultivated in gardens. Makes excellent hedges around bungalows, gardens, fields and ancient monuments of Delhi and New Delhi. The seeds are eaten raw or in curries.

Local name : Vilayti imli ; Jangal zalebi

Flowers : April-July. Fruits : June-Aug.

J. K. Maheshwari 170, Cavalry Lines

40. Rosaceae

Ovary inferior ; fruit a pome :

Inflorescence a terminal panicle ; leaves leathery

Eriobotrya

Inflorescence a terminal cyme or corymb ; leaves thin

Pyrus

Ovary superior ; fruit not a pome :

Leaves simple :

Small shrubs ; carpels 5 or more

Spiraea

Shrubs or trees ; carpel 1

Prunus

Leaves compound :

Erect or climbing shrubs ; fruit an aggregate of achenes enclosed in a fleshy calyx

Rosa

Herbs ; achenes on a dry receptacle

Potentilla

Eriobotrya Lindl.

E. japonica (Thunb.) Lindl. in TLS. 13 : 102, 1822 ; Benthalt, Trees Calc. 226.

Mespilus japonicus Thunb. Fl. Jap. 206, 1784.

An erect or suberect, evergreen, small or medium-sized tree. Bark dull black. Branches and branchlets spreading above. Leaves large, clustered at the ends, leathery, 30×10 cm. or more, tapering at the ends, prominently veined. Flowers dull white, fragrant, in terminal panicles. Pomes pyriform or globose, baccate, yellow or orange.

Commonly cultivated in the Sabzimandi and Sarai Rohilla fruit orchards, for its sweet fruits which are sold in the market during the hot months. Off-season flowers appear in September and they generally fall off without producing any fruit.

Local name : Lokat ; Lukat

Flowers : Nov.-Dec. Fruits : March-April

J. K. Maheshwari 400, Gardens on way to Sarai Rohilla

Pyrus Linn.

P. pyrifolia Nakai var. *culta* Nakai in Bot. Mag. Tokyo 40 : 564, 1926. *P. sinensis* Hort. (non Linn.).

An erect, medium-sized or large tree. Bark grey, fissured. Leaves broad ovate to elliptic or oblong-orbicular, $6-10 \times 5.5-8$ cm., acuminate, long-petioled. Flowers white or tinged with pink. Pomes $7-9 \times 5-8$ cm., variable, mostly pyriform or subglobose, yellow. Seeds lenticular.

Commonly cultivated in the Sarai Rohilla, Kingsway Camp and Sabzimandi Gardens for its edible fruits.

Local name : Nashpati

Flowers : April-May. Fruits : July-Sept.

J. K. Maheshwari 194, Prem Bari (Azadpur) : 1016

Spiraea Linn.

S. cantoniensis Lour. Fl. Cochinch. 322, 1790 ; Bailey, Man. Cult. Pl. 497.

S. corymbosa Roxb. Hort. Beng. 38, 1814, nom. nud. & Fl. Ind. 2 : 512, 1832.

A small, handsome, evergreen shrub. Branches reddish-brown. Leaves oblong-lanceolate, serrate, bluish-green. Flowers white, in dense, umbelliform corymbs, with the leaves.

Native of China and Japan. Grown as an ornamental plant in the hedges and shrubberies of gardens.

Flowers : March-April

J. K. Maheshwari 650, Rashtrapati Bhavan Campus

Prunus Linn.

Flowers pink ; drupes pubescent

Flowers white or pink ; drupes glabrous

*P. persica**P. domestica* ssp. *insititia*

FUGP. 1 : 324 ; Parker, For. Fl. 204.

P. persica (Linn.) Stokes, Bot. Mat. Med. 3 : 100, 1812 ; FBI. 2 : 313 ;*Amygdalus persica* Linn. Sp. Pl. 472, 1753.

A large shrub or small tree. Leaves oblong-lanceolate, finely serrate, with petiolar and marginal glands. Flowers pink, showy, appearing before the leaves. Fruits about 4×3 cm., variable in size and shape, pubescent, yellow or red-spotted ; stones hard, deeply pitted.

Commonly grown in the fruit orchards near Kingsway Camp, Sabzi-mandi, Sarai Rohilla and on Karnal Road for its sweet, edible fruits. Also planted in gardens, lawns and in hedges around bungalows for its profuse, beautiful blooms.

Local name : Aru ; English name : Peach

Flowers : Jan.-March. Fruits : June

J. K. Maheshwari 121, Azadpur ; 1358

P. domestica Linn. subsp. *insititia* (Linn.) Schneid. Ill. Handb. Laubholz. 1 : 630, 1906.

P. insititia Linn. Cent. Pl. 1 : 12, 1755.*P. communis* Huds. var. *insititia* Hook. f. in FBI. 2 : 315, 1878 ; FUGP. 1 : 324.

A large, woody shrub or small tree. Leaves ovate to oblong-lanceolate, 6-10×1.7-2.5 cm., membranous, sharply serrate. Flowers small, white, appearing before or with the leaves. Drupes smooth, globose or ovoid, yellow, often with a reddish tinge or dark red.

Commonly cultivated in the fruit orchards of Sarai Rohilla, Sabzi-mandi, Azadpur and Kingsway Camp for its sweet, juicy fruits.

Local name : Alucha ; Alu-bukhara ; English name : Plum

Flowers : Oct.-Nov. Fruits : May-June

J. K. Maheshwari 542, on way to Sarai Rohilla ; 662, Azadpur

Rosa Linn.

Several types of roses of erect, scrambling or climbing habit are grown in public and private gardens and in the orchards below the fruit trees. The common colours of the flowers are white, pink, rosy, red or purplish. Generally the flowers fall off but the roses growing in the fruit orchards of Delhi do sometimes produce globose fruits. The species cultivated in the area are :

R. multiflora Thunb. Fl. Jap. 214, 1784 ; Bailey, Man. Cult. Pl. 533.

R. banksiae R. Br. in Ait. f. Hort. Kew. 3 : 256, 1811.

A climbing rose. Flowers white, small, in umbelliform clusters.

Flowers : April

J. K. Maheshwari 1189, Mughal Gardens

R. indica Linn. Sp. Pl. 492, 1753.

R. damascena Mill. Gard. Dict. n. 15, 1768 ; Bailey, op. cit. 535.

Potentilla Linn.

P. supina Linn. Sp. Pl. 497, 1753 ; FBI. 2 : 359 ; FUGP. 1 : 327.

A prostrate, much-branched, leafy herb. Leaves pinnately 3 to 9-foliate. Leaflets lobulate. Flowers yellow, solitary. Receptacle globose. Achenes many, minute.

Common during the winter months in Khadar area, especially along the banks of Jamuna and temporary ponds, on moist, sandy or sandy-silty soil, forming a green carpet of its own or associated with other winter ephemerals.

Local name : Dodi

Flowers and Fruits : Jan.-April, rarely up to Sept.
J. K. Maheshwari 597, Jamuna Banks

41. Combretaceae

Erect trees or shrubs ; petals absent :

Flowers in spikes

Flowers in globose heads

Climbing or sarmentose shrubs ; petals 5

Terminalia

Anogeissus

Quisqualis

Terminalia Linn. nom. cons.

Fruits fleshy, tomentose, ovoid, without wings *T. bellirica*

Fruits coriaceous, 5 to 7-winged ;

Leaves subopposite ; wings of fruits narrow *T. arjuna*

Leaves subopposite or alternate above ; wings of fruits broad *T. tomentosa*

T. bellirica (Gaertn.) Roxb. Pl. Cor. 2 : 54, t. 198, 1805 ; FBI. 2 : 445 ; FUGP. 1 : 335.

Myrobalanus bellirica Gaertn. Fruct. 2 : 90, t. 97, 1790.

A medium-sized or large, deciduous tree. Bark dark grey. Trunk tall. Leaves 10-20 × 8-11 cm., broadly elliptic, coriaceous, long-petiolate. Flowers greenish-yellow, foetid-smelling, in slender, interrupted spikes. Drupes ovoid or ellipsoid, grey-velvety.

This tree forms a beautiful avenue along Barakhamba and Sikandra Roads in New Delhi. Also planted in public gardens and parks. The fruits are medicinal and relished by animals.

Local name : Bahera ; Desi badam
 Flowers : April-June. Fruits : Cold season
 J. K. Maheshwari 665, Sikandra Road

T. arjuna (Roxb. ex DC.) Wt. & Arn. * Prodr. 314, 1834 ; Dalz. & Gibs. Bomb. Fl. 91, 1861 ; Bedd. Fl. Sylv. t. 28, 1869.

Pentaptera arjuna Roxb. Hort. Beng. 34, 1814, nom. nud. ; DC. Prodr. 3 : 14, 1828, cum descript.

P. glabra Roxb. Hort. Beng. 34, 1814, nom. nud. & Fl. Ind. 2 : 440, 1832, cum descript.

Terminalia glabra Wt. & Arn. Prodr. 314, 1834 ; FUGP. 1 : 336.

A medium-sized or large, handsome, glabrous tree. Bark whitish or pinkish-grey. Leaves opposite or subopposite, oblong or elliptic, with 1-2 glands at base. Flowers pale yellow, in pendulous, terminal and axillary spikes. Fruits ovoid or obovoid-oblong, 4 to 5-winged or more.

Planted along several roads of Delhi and New Delhi. Also grown in gardens and lawns around bungalows.

Local name : Arjun ; Terminalia ; Patju ; Jumela

Flowers : April-July. Fruits : July-Aug.

J. K. Maheshwari 262, Najafgarh Road

T. tomentosa Wt. & Arn. Prodr. 314, 1834 ; FBI. 2 : 447 ; FUGP. 1 : 337.

A medium-sized or large, deciduous tree. Leaves oblong to obovate, entire, emarginate. Flowers dull yellow, in panicle, lax spikes. Fruits 5-winged ; wings transversely striated, crenulate.

Cultivated in lawns, gardens and along roadsides.

Flowers : June-Aug.

J. K. Maheshwari, passim in gardens

Anogeissus Wall.

Calyx tube shorter than the fruit ; branches pendulous . . . *A. pendula*

Calyx tube longer than the fruit ; branches not pendulous . . . *A. acuminata*

*The oldest names for this plant are the following :

Terminalia arjuna Wt. & Arn. Prodr. 314, 1834 ; Dalz. & Gibs. Bomb. Fl. 91, 1861.

Terminalia berryi Wt. & Arn. Prodr. 314, 1834.

Terminalia glabra Wt. & Arn. Prodr. 314, 1834 ; Dalz. & Gibs. Bomb. Fl. 91, 1861.

Pentaptera arjuna Roxb. Hort. Beng. 34, 1814, nom. nud. ; DC. Prodr. 3 : 14, 1828.

Pentaptera glabra Roxb. Hort. Beng. 34, 1814, nom. nud. & Fl. Ind. 2 : 440, 1832.

Roxb.'s specific names *arjuna* and *glabra* of 1814 are nomina nuda, and therefore invalid for nomenclature ; the oldest next name and the first valid one for the plant is DC.'s *Pentaptera arjuna* of 1828 ; the specific epithet *arjuna* is, therefore, the only valid one for the plant ; it is wrong as Duthie (in FUGP. 1 : 336, 1903) has done to say *Terminalia glabra*. Further *Terminalia arjuna* is attributed to Bedd. Fl. Sylv. t. 28 ; this is of 1869, and therefore later than Dalz. & Gibs.' Bombay Flora, 1861, and Wt. & Arn.'s Prodr., 1834.

A. pendula Edgew. in JASB. 21 : 171, 1853 ; FBI. 2 : 451 ; FUGP. 1 : 339.

A shrub or small tree, branching from base. Young parts purplish. Stems ash-coloured or grey-white. Leaves 1.5-3 x 0.9-1.3 cm., variable, ovate to elliptic, apiculate. Flower buds vermillion-coloured. Flowers greenish-yellow, in axillary and terminal, globose heads turning dull red in fruits. Fruits nearly orbicular, 2-winged, 4 x 4-5 mm.

According to Champion's (1936) classification of Forest Types of India, Delhi, Etawah and Ajmer have local patches of dry, deciduous forest such as the *Anogeissus pendula* sub-type. These trees in the present explorations were seen only in protected parts of New Delhi Ridge and Faridabad-Gurgaon hillocks.

Occurs commonly on the New Delhi Ridge as well as in the hilly region of Gurukul Indraprastha near Faridabad. Rare on the Old Delhi Ridge. It is subject to rather heavy exploitation. The cattle greedily eat the foliage, so that in the hilly tracts near Faridabad, the plant is reduced to a prostrate, stunted shrub spreading on rocks and giving an entirely different appearance from those growing in protected areas. Used in plasters for inflammation troubles.

Local name : Dhoy ; Siras

Flowers and Fruits : Aug.-Sept.

J. K. Maheshwari 822 ; 1183, New Delhi Ridge ; 1234, Gurukul Indraprastha near Faridabad (Punjab)

A. acuminata (Roxb. ex DC.) Wall. Cat. 4014, 1831, nom. nud. ; Brandis, For. Fl. 228, 1874 ; Kurz, For. Fl. Burma 1 : 466, 1877 ; FBI. 2 : 450. *Conocarpus acuminatus* Roxb. Hort. Beng. 34, 1814, nom. nud. ; DC. Prodr. 3 : 17, 1828 ; Roxb. Fl. Ind. 2 : 443 ; Wt. & Arn. Prodr. 316.

A small tree. Bark dark grey. Leaves ovate or oblong-lanceolate, acute or subacuminate. Flower heads solitary, long-peduncled. Fruits tomentose ; wings broader than long, irregularly dentate.

I have not found it wild. A few trees are planted in Lodi Gardens.

Flowers and Fruits : Aug.-Nov.

J. K. Maheshwari 1456

Quisqualis Linn.

Q. indica Linn. Sp. Pl. 556, 1762 ; Bailey, Man. Cult. Pl. 724 ; Bor & Raiz. 178, Pl. 66.

A large, climbing or scandent, deciduous shrub. Leaves elliptic or ovate-oblong, 6-13 x 3-6 cm. Flowers deep pink to red, fragrant, showy, in terminal, drooping spikes. Corolla tube 7 x 0.2 cm.

Native of Java and Malay Peninsula. Commonly grown in gardens for ornamental purposes.

Flowers : April-Oct.
J. K. Maheshwari 539, Qudsia Road

42. Myrtaceae

- Inflorescence resembling a bottle-brush ; flowers in spikes or heads : *Callistemon*
 Stamens free *Melaleuca*
 Stamens united into bundles opposite the petals
 Inflorescence not as above ; flowers solitary, clustered or in umbels or heads : *Eucalyptus*
 Calyx lobes and petals united to form an operculum of cap ; fruit a dehiscent capsule
 Calyx lobes and petals distinct ; fruit a berry : *Psidium*
 Flowers large, white, on 1 or few-flowered peduncles ; ovary 4 to 5-celled
 Flowers small, greenish-white, in terminal, axillary or lateral cymes ; ovary 2-celled *Syzygium*

Callistemon R. Br.

C. lanceolatus DC. Prodr. 3 : 223, 1828 ; Parker, For. Fl. 245 ; Benthall, Trees Calc. 249.

A large, evergreen shrub or tree with fissured bark and drooping branches. Leaves alternate, linear-lanceolate, $4.7 \times 0.4-0.6$ cm. Flowers crimson, in terminal spikes. Stamens numerous, long-exserted. Capsules with a truncate apex.

Cultivated in gardens, hedges and lawns for ornamental purposes. The inflorescence resembles a bottle-brush and hence its common name.

English name : Bottle-brush

Flowers : Oct.-Feb.

J. K. Maheshwari 579, Nicholson Gardens

Melaleuca Linn. nom. cons.

M. leucadendron Linn. Mant. 105, 1767 ; Parker, For. Fl. 245 ; Benthall, Trees Calc. 247.

A tree with pendulous branches. Leaves $6.9 \times 1.1-1.5$ cm., flat, elliptic or oblong, parallel-veined. Flowers yellowish-white, in terminal spikes. Capsules subglobose.

Cultivated in gardens for ornament.

English name : Cajeput-tree

Flowers and Fruits : May

J. K. Maheshwari 1219, Roshanara Gardens

Eucalyptus L'Hérit.

Some species of *Eucalyptus* have been successfully introduced in gardens, lawns and unused ground near canal banks of Delhi. It is also growing as small plantations in the district. W. R. Mustoe, formerly Superintendent of Government Horticultural Department, New Delhi, near Bela Road behind Red Fort and also near Okhla Water Reservoir. The Bela Plantation can be seen even today and the wood is used as timber. The leaves are used as flavouring agents and kept in books to repel insects. The following species are cultivated in the area.

E. globulus Labill. Voy. 1 : 153, t. 13, 1800 ; Parker, For. Fl. 250 ; Bailey, Man. Cult. Pl. 727.

A tall tree. Bark peeling in long strips or sheets. Trunk smooth, greyish or bluish-white. Leaves lanceolate. Flowers large, 1-3 together in axils. Operculum depressed-hemispheric, abruptly pointed.

E. tereticornis Sm. Bot. N. Holl. 41, 1793 ; Parker, For. Fl. 251 ; Bailey, op. cit. 728.

A tall tree. Bark grey, peeling in thin layers. Flowers 4-8 together in an umbel. Operculum conical, acuminate, 2-4 times longer than calyx tube.

E. citriodora Hook. in Mitch. Jour. Trop. Aust. 235, 1848 ; Benthall, Trees Calc. 246.

A tall, handsome tree. Bark shining, whitish or reddish-grey. Flowers in short panicles. Operculum double, inner transparent ; outer hemispheric, pointed.

E. paniculata Sm. in TLS, 3 : 287, 1797 ; Parker, For. Fl. 248.

A tall or medium-sized tree. Bark hard, persistent, deeply fissured, grey-brown. Leaves lanceolate, acuminate. Flowers in panicles. Operculum variable. Fruits truncate-ovate.

E. camaldulensis Dehnh. Cat. Pl. Hort. Camald. 20, 1832 ; Bailey, Man. Cult. Pl. 728.

E. rostrata Schl. in Linnaea 20 : 655, 1847 ; Parker, For. Fl. 251.

A tall tree. Bark ashy-grey or white. Flowers in lateral or supra-axillary umbels, solitary or in few-flowered peduncles. Operculum hemispheric, sharply beaked.

E. rudis Endl. in Enum. Pl. Hueg. 49, 1837 ; Parker, For. Fl. 249 ; Bailey, loc. cit.

A tall tree. Bark rough, grey-persistent. Leaves ovate to narrow lanceolate. Flowers 4-8 together, in a peduncled umbel. Operculum conical, not beaked, about as long as calyx tube. Fruits broadly turbinate.

Flowers : July-Sept.

J. K. Maheshwari 281

Psidium Linn.

Young branchlets 4-angled; veins of leaves conspicuously impressed
above and raised below *P. guajava*

Young branchlets terete; veins of leaves not
prominent *P. cattleianum*

P. guajava Linn. Sp. Pl. 470, 1753; Parker, For. Fl. 245; Benthall, Trees
Calc. 244.

An erect, woody shrub to medium-sized tree. Bark scaly, brownish.
Wood reddish-brown. Leaves coriaceous, oblong-elliptic, the veins pro-
minently impressed above. Flowers white, about 2.5 cm. in diam. Fruits

globose, ovoid or pyriform, yellow with white or deep pink pulp.
Introduced. Grown in all the fruit orchards of Delhi for its edible
fruit which is sold extensively in the market.

Local name: Amrood

Flowers and Fruits: July-Sept.

J. K. Maheshwari 227, Karnal Road Gardens; 412, Uzirpur Gardens

P. cattleianum Sabine in Trans. Hort. Soc. Lond. 4: 317, t. 11, 1822;
Bailey, op. cit. 729.

A bushy shrub with grey-brown bark. Leaves obovate to elliptic,
thick, leathery, the veins not prominently impressed. Flowers white.
Fruit obovate to globose, much smaller than the above, purplish-red.

Introduced. There are some plants in the shrubbery of Government
Sunder Nursery that produce flowers and fruits.

Local name: Japani amrood

Flowers: July

J. K. Maheshwari 1124, Sunder Nursery

Syzygium Gaertn. nom. cons.

S. cumini (Linn.) Skeels in U.S. Dept. Agric. Bur. Pl. Ind. Bull. No. 248: 2,
1912; Benthall, Trees Calc. 242; Santapau in RBSI. 16(1): 105, 1953.
Myrtus cumini Linn. Sp. Pl. 471, 1753.

Eugenia jambolana Lamk. Encycl. 3: 198, 1789; FBI. 2: 499;
FUGP. 1: 342.

Syzygium jambolanum DC. Prodr. 3: 259, 1828; Gamble, Fl. Pres.
Mad. 481.

A medium-sized or large tree. Bark smooth, grey. Leaves 7.5-15 x
5 cm. Panicles lateral, from the scars of fallen leaves. Flowers greenish-
white. Berries ovoid or oblong to ovoid-oblong, dark purple, juicy,
1-seeded.

Commonly cultivated in the Sabzimandi, Sarai Rohilla, Kingsway Camp and Karnal Road Gardens for its fruits which are eaten raw and sold in the market. Has been planted as a roadside tree in New Delhi.

Local name : Jamun

Flowers : April-June. Fruits : June-July

J. K. Maheshwari 90, Roshanara Gardens

43. Lythraceae

| | |
|--|---|
| Herbs | |
| Shrubs or trees : | <i>Ammannia</i> |
| Flowers irregular ; calyx tube slightly curved | |
| Flowers regular ; calyx tube straight : | <i>Woodfordia</i> |
| Flowers tetramerous ; stamens 8 | |
| Flowers hexamerous ; stamens indefinite | <i>Lawsonia</i>
<i>Lagerstroemia</i> |

Ammannia Linn.

Leaves narrowed to the base ; flowers clustered in the leaf axils ; petals absent

Leaves subauriculate at base ; flowers in compound, stalked cymes ; petals bright pink, caducous

A. baccifera Linn. Sp. Pl. 120, 1753 ; FBI. 2 : 569 ; FUGP. 1 : 350.

An erect, glabrous herb in marshes. Stems and branches angular, purplish. Leaves opposite, narrowed to the base. Flowers in condensed, axillary racemes or clusters. Capsules red when ripe, glabrous.

Common in moist, sandy places and along canal banks, often associated with marshy sedges.

Flowers and Fruits : June-Oct., also in Jan.

J. K. Maheshwari 1068, Karnal Road

A. senegalensis Lamk. Tabl. Encycl. 1 : 312, n. 155, t. 77, f. 2, 1791 ; FBI. 2 : 570 ; FUGP. 1 : 350.

An erect, glabrous, branched herb, 20-45 cm. tall. Leaves 2.5-5.5 x 0.5-1 cm., oblong. Flowers bright pink, in whorled, compound cymes. Petals caducous. Capsules small, globose.

A moisture-loving plant, found along canal banks on wet, marshy soil.

Flowers : Sept.-Oct.

J. K. Maheshwari 437, Najafgarh ; 494

Woodfordia Salisb.

W. fruticosa (Linn.) Kurz in JASB. 40 : 56, 1871 ; Santapau in RBSI. 16(1) : 114, 1953.

Lythrum fruticosum Linn. Sp. Pl. 641, 1762.

Woodfordia floribunda Salisb. Parad. Lond. t. 42, 1806; FBI. 2: 572 (excl. syns.); FUGP. 1: 351.

A large shrub with long, spreading branches. Bark reddish-brown, peeling off in fibres. Leaves 5-10 × 2 cm., ovate-lanceolate. Flowers in axillary clusters, on slender pedicels. Capsules 9 × 4 mm., enclosed by the persistent calyx tube.

Cultivated in gardens and as hedges for ornamental purposes.

Flowers and Fruits: Feb.-April

J. K. Maheshwari 638, Rashtrapati Bhavan Campus

Lawsonia Linn.

L. inermis Linn. Sp. Pl. 349, 1753; Santapau, loc. cit.

L. alba Lamk. Encycl. 3: 106, 1789; FBI. 2: 573; FUGP. 1: 352.

A shrub or small tree with thin, greyish-brown bark. Leaves 1.5-4 × 1-1.5 cm., nearly sessile, elliptic, coriaceous. Flowers whitish, turning yellow after picking, pungent-scented, in large, corymbosely branched, terminal panicles. Capsules about 6 × 8 mm., globose. Seeds angular, brown.

Planted as a hedge. The leaves are used to dye the nails, skin and beard. A large plantation is seen in village Vallabgarh where it is cut twice a year for its leaves.

Local name Mehndi

Flowers and Fruits June-Oct.

J. K. Maheshwari 208, Talkatora Gardens; 1304

Lagerstroemia Linn.

Shrubs with white, pink or purple flowers *L. indica*

Trees with white-mauve or mauve flowers:

Flowers mauve-coloured *L. speciosa*

Flowers mauve mottled with white *L. thorelii*

L. indica Linn. Syst. 1076, 1759; Blatt. & Mill. Beaut. Ind. Tr. 105

A deciduous, glabrous shrub, 1.8-3.6 m. tall. Bark smooth, brown. Leaves elliptic or oblong, 3-6 × 2-3 cm. Flowers pink, white or purple. Capsules woody, 1.3 × 1.2 cm.

Native of China. An ornamental shrub grown in the hedges of gardens.

Flowers: March-July

J. K. Maheshwari 225, Talkatora Gardens; 522

L. speciosa (Linn.) Pers. Syn. 2: 72, 1806; Koehne in Pfreich. 17 261 1903; Benthall, Trees Calc. 260; Blatt. & Mill. op cit. 100, t. 21

Munchausia speciosa Linn. in Muench. Hausv. 1 357 t. 2, 1770.

Lagerstroemia flos-reginae Retz. Obs. 5: 25, 1788.

A small or medium-sized tree. Leaves 12-30 x 6-10 cm., elliptic or ovate-lanceolate. Flowers large, handsome, mauve, in large, terminal panicles. Calyx ribbed. Capsules globose. Cultivated in gardens, lawns and near ponds mainly for decoration.

Local name : Jarul

Flowers : June-Aug. Fruits : Oct.-Nov.

J. K. Maheshwari 92, Roshanara Gardens

L. thorelii Gagnep. in Lecomte, Not. Syst. 3 356, 1918 Benthall, Trees Calc. 262.

A small, bushy tree. Leaves large, coriaceous. Flowers white-mauve. Capsules globose, adnate to the calyx, about 2 x 2 cm. A few trees have been planted in the lawns around Gandhiji's Samadhi at Rajghat.

Fruits June

J. K. Maheshwari 53

44. Punicaceae

Punica Linn.

P. granatum Linn. Sp. Pl. 472, 1753 ; FBI. 2 581 ; FUGP 1 354 Parker, For. Fl. 253.

A shrub or small tree. Bark dark grey. Leaves oblong, obovate or oblanceolate. Flowers bright red or vermillion-red, terminal, solitary or in 3-flowered cymes. Fruits reddish-brown, globose. Seeds angled aril filled with an acidic or sweet juice.

Cultivated in the fruit orchards for its edible fruits. Also planted in the hedges of gardens.

Local name : Anar ; English name : Pomegranate

Flowers : April-July. Fruits : July-Sept.

J. K. Maheshwari 207, Nicholson Gardens ; 688, Mughal Gardens 1011

45. Onagraceae

Jussiaea Linn.

Flowers white *J. repens*

Flowers yellow *J. perennis*

J. repens Linn. Sp. Pl. 388, 1753 ; FBI. 2 : 587 ; FUGP. 1 : 355.

A floating aquatic or creeping on mud. Stems rooting at the nodes and with number of spongy vesicles at the nodes. Leaves obovate to oblanceolate. Flowers white, solitary, aerial. Capsules cylindric

Common in and on the borders of ponds and canals. The leaves are eaten away by an insect.

Local name : Pani ki ghas

Flowers : Sept.-Oct.

J. K. Maheshwari 478, Najafgarh Canal

J. perennis (Linn.) Brenan in Kew Bull. 163, 1953.

Ludwigia perennis Linn. Sp. Pl. 119, 1753.

L. parviflora Roxb. Fl. Ind. 1 : 440, 1820 ; FBI. 2 : 588.

An erect, glabrous herb, 10 cm. or more tall. Stems pale red. Leaves lanceolate to linear-lanceolate, tapering at ends. Flowers yellow, solitary, axillary, tetramerous. Stamens 4. Capsules oblong, 10×2 mm., many-seeded.

Occurs rarely. Found in moist spots along the banks of Najafgarh Drain. It often escapes notice due to its short size and being hidden in the grass.

Flowers : Aug.

J. K. Maheshwari 1248, Najafgarh Canal Banks

46. Trapaceae

Trapa Linn.

T. bispinosa Roxb. Hort. Beng. 11, 1814, nom. nud. & Fl. Ind. 1 : 428, 1832 ; FBI. 2 : 590, in part ; FUGP. 1 : 358.

An aquatic herb, ascending in the water. Floating leaves arranged in a rosette, rhomboidal ; submerged ones dissected ; petioles spongy near top. Flowers white, solitary. Nuts angled, shortly beaked at the apex and with a sharp, spiny horn on either side.

Cultivated in the Najafgarh, Shahdara and Hindan Canals, lakes and ponds for its edible fruit which is eaten raw or cooked. The four common kinds grown in the area are (1) Red Fruited, (2) Green Fruited, (3) Muthhidar, and (4) Dogra.

Local name : Singhara

Flowers : Sept. Fruits : Sept.-Dec.

J. K. Maheshwari 557

47. Caricaceae

Carica Linn.

C. papaya Linn. Sp. Pl. 1036, 1753 ; FBI. 2 : 599 ; FUGP. 1 : 383 ; Benthall, Trees Calc. 267.

A rapidly growing tree, 4.5-7.5 m. tall with weak, succulent trunk and milky sap. Leaves palmately lobed. Flowers creamy-yellow. Male flowers in long, drooping panicles and females in short clusters. Native of W. Indies and C. America. Commonly cultivated in lawns and shrubberies around bungalows and in gardens for its fruit.

Local name : Papita

Flowers and Fruits : Greater part of the year

J. K. Maheshwari 1361

48. Cucurbitaceae

Several cultigens of this family are grown for their fruits which are much used as vegetable, either raw or cooked during the hot and monsoon months. They are commonly cultivated on sandy beds along the banks of Jamuna River, its tributaries and also near Najafgarh, Okhla and Hindan Canals.

Anther cells straight :

Style with an annular disc at the base *Melothria*

Style without a disc at the base ; petiole with a stipule-like ciliate bract *Ctenolepis*

Anther cells flexuose or conduplicate :

Corolla divided nearly to the base :

Petals fimbriate *Trichosanthes*

Petals entire :

Calyx tube of male flowers elongate ; anthers included *Lagenaria*

Calyx tube of male flowers short ; anthers more or less exerted :

Stamens inserted near the mouth of calyx tube :

Staminate flowers in racemes ; ripe fruit dry *Luffa*

Staminate flowers solitary ; fruit fleshy *Benincasa*

Stamens inserted below the mouth of calyx tube :

Staminate flowers solitary or racemed ; tendrils simple *Momordica*

Staminate flowers clustered or solitary ; tendrils simple *Cucumis*

Male and female flowers solitary ; tendrils branched *Citrullus*

Corolla gamopetalous, bell-shaped :

Tendrils simple ; flowers white *Coccinia*

Tendrils branched ; flowers yellow *Cucurbita*

Melothria Linn.

M. maderaspatana (Linn.) Cogn. in DC. Mon. Phan. 3 : 623, 1881 ; FUGP. 1 : 379.

Cucumis maderaspatanus Linn. Sp. Pl. 1012, 1753.

Mukia scabrella (Linn. f.) Arn. in Hook. Lond. Jour. Bot. 3 : 276, 1844 ; FBI. 2 : 623.

Bryonia scabrella Linn. f. Suppl. 424, 1781.

A scabrous, scandent, climbing annual. Leaves $3-8 \times 8.5$ cm., 3 to 5-lobed. Flowers yellow. Male flowers in clusters. Fruits globose, small, bright red when ripe.

A common climber on shrubs and trees. The attractive berries are eaten by parrots, the *bulbul* and other birds and only the seeds that pass out of their stomach are said to germinate. The cattle like the plant but it is believed that the berries destroy the eyes and hence its local name.

Local name : Ankh phod ki bel

Flowers : July-Oct. Fruits : Cold season

J. K. Maheshwari 760, Okhla ; 996

Ctenolepis Hook. f.

C. garcini (Linn.) Cl. in FBI. 2 : 629, 1879.

Sicyos garcini Linn. Mant. 297, 1771.

Blastania garcini Cogn. in DC. Mon. Phan. 3 : 629, 1881 ; FUGP. 1 : 379.

A pretty, annual climber. Leaves 5-lobed. Stipuliform bracts ciliate. Flowers pale green, small. Fruits globose, about 1.2×1.2 cm., red when ripe.

Common in the area climbing upon trees and shrubs. The mucilaginous sap of the fruit is irritating to the eyes. The plant is said to be used medicinally.

Flowers and Fruits : Oct.-Feb.

J. K. Maheshwari 807

Trichosanthes Linn.

Male flowers solitary ; fruits oblong, red

Male flowers in racemes :

Male racemes ebracteate ; fruits ovoid, conical, pulp red

Male racemes with minute bracts ; fruits elongate-cylindric

T. dioica Roxb. Hort. Beng. 70, 1814, nom. nud. & Fl. Ind. 3 : 701, 1832 ; FBI. 2 : 609 ; Duthie & Fuller, Field & Gard. Crops 3 : 23.

A climbing herb. Stems woolly. Leaves ovate-oblong, cordate,

sinnate-dentate. Flowers dioecious. Fruits orange-red, pointed at either end.
Cultivated. Also found spreading on the bushes of *Capparis septaria* Linn.

Local name : Palwal ; Parwal ; Parul
Flowers and Fruits : Rainy season

T. cucumerina Linn. Sp. Pl. 1008, 1753 ; FBI. 2 : 609 ; FUGP. 1 : 364.
A climbing or spreading, scabrous, stout herb. Tendrils divided. Leaves usually 5-lobed or angled ; margins denticulate. Flowers white, with fimbriate petals. Male peduncles paired. Female flowers solitary. Fruits yellow, pointed.

Common on the Ridge during the rains ; also found amongst the roadside hedges of gardens.

Local name : Jangli chachinda , Rumbel
Flowers : Rainy season. Fruits Sept.-Oct.
J. K. Maheshwari 997, Ridge

T. anguina Linn. Sp. Pl. 1008, 1753 FBI. 2 : 610 Duthie & Fuller, op. cit. 2 : 45, t. 46.

A climbing or trailing herb. Leaves 5 to 7-lobed. Flowers white. Fruits long, fusiform, variable in shape and size, bright orange when ripe. Cultivated for its fruit which is usually eaten cooked.

Local name : Chichinda English name : Snake gourd
Flowers and Fruits : Rainy season
J. K. Maheshwari 1440

Lagenaria Ser.

L. vulgaris Ser. in Mém. Soc. Phys. Genève 3(1) : 25, 1825 FBI. 2 : 613
Duthie & Fuller, op. cit. 2 : 48, t. 48.

Cucurbita lagenaria Linn. Sp. Pl. 1010, 1753.

A softly pubescent, climbing or trailing herb. Leaves 3 to 5-lobed or angled. Flowers large, white. Fruits variable in size and shape, usually bottle- or dumbbell-shaped.

Cultivated as vegetable.

Local name : Lauki English name : Bottle gourd
Flowers and Fruits : Rainy season
J. K. Maheshwari 1441

Luffa Cav.

Stamens 3 ; fruits sharply 10-ridged *L. acutangula*
Stamens 5 ; fruits not ridged *L. cylindrica*

L. acutangula (Linn.) Roxb. Hort. Beng. 70, 1814, nom. nud. & Fl. Ind. 3 : 713, 1832 ; FBI. 2 : 615 ; Duthie & Fuller, op. cit. 2 : 60, t. 62.

Cucumis acutangulus Linn. Sp. Pl. 1011, 1753.
An extensively trailing plant. Flowers pale yellow. Male flowers in erect, axillary racemes. Stamens 3. Fruits 20-30 x 5-8 cm., acutely 10-angled.

Cultivated.

Local name : Tori

Flowers and Fruits : Rainy season

J. K. Maheshwari 683

L. cylindrica (Linn.) Roem. Syn. Pepon. 63, 1846 ; Duthie & Fuller, op. cit. 2 : 61, t. 63.

Momordica cylindrica Linn. Sp. Pl. 1009, 1753.

Luffa aegyptiaca Mill. Gard. Dict. 1768 ; FBI. 2 : 614.

Climbing or trailing, scabrous annual. Leaves orbicular-reniform, palmately lobed or angled. Flowers yellow, male and female from the same axil. Male flowers in panicles. Fruits cylindrical or fusiform, obscurely 10-ribbed. Seeds black.

Cultivated as vegetable and may be seen spreading over bushes or on roofs.

Local name : Ghia-torai

Flowers and Fruits : July-Sept.

J. K. Maheshwari 192, Wazirpur

Benincasa Savi

B. hispida (Thunb.) Cogn. in DC. Mon. Phan. 3 : 513, 1881.

Cucurbita hispida Thunb. Fl. Jap. 322, 1784.

Benincasa cerifera Savi in Bibl. Ital. 9 : 158, 1818 & Mem. Sopra Piant. Cucurb. 1 : 6, 1818 ; FBI. 2 : 616 ; Duthie & Fuller, op. cit. 2 : 43, t. 45.

A large, climbing or trailing gourd. Leaves 5 to 7-lobed, hispid beneath. Flowers large, yellow. Fruits fleshy, broad oblong or ovoid-cylindric, with a waxy bloom ; flesh white.

Cultivated for its fruit which is eaten as vegetable and also used in the preparation of 'Petha' by the local confectioners.

Local name : Petha ; English name : White gourd

Flowers and Fruits : Rainy season

Momordica Linn.

Male and female flowers on same plant ; fruits tubercled . *M. charantia*
Male and female flowers on different plants ; fruits spinose . *M. dioica*

M. charantia Linn. Sp. Pl. 1009, 1753; FBI. 2: 616; Duthie & Fuller, op. cit. 2: 62, t. 64.

A climber or trailer. Leaves deeply lobed or divided into pinnatifid lobes. Flowers yellow. Fruits orange-coloured when ripe, oval or fusiform, deeply tubercled.

Cultivated. Also found as an escape amongst the hedges.

Local name: Karela; English name: Bitter gourd.

Flowers and Fruits: June-Sept.

J. K. Maheshwari 32

M. dioica Roxb. ex Willd. Sp. Pl. 4: 605, 1805; FBI. 2: 617 (excl. syns.); FUGP. 1: 370.

A climbing or spreading shrub. Leaves usually 3 to 5-lobed. Male flowers with a conspicuous, cow-like, inflated bract at top of pedicel. Fruits ovoid, clothed with blunt spines, yellow at maturity. Seeds embedded in a red pulp.

Not common. Occurs in a wild condition in the hilly tracts of Mehrauli and Faridabad, twining upon *Capparis sepium* Linn., *Phoenix sylvestris* Roxb., and other plants, or spreading upon grass. The fruits are used as vegetable.

Local name: Jangli karela; Murela; Ban karela

Flowers and Fruits: July-Oct.

J. K. Maheshwari 1149, Mehrauli; 1233, Gurukul Indraprastha (Gurgaon Dist.)

Cucumis Linn

Fruits glabrous or pubescent *C. melo*

Fruits sparingly tubercled, muricate with prickles *C. sativus*

C. melo Linn. Sp. Pl. 1011, 1753; FBI. 2: 620; Duthie & Fuller, op. cit. 2: 51, t. 50.

A creeping, hispid annual. Leaves scabrous. Flowers yellow, in fascicles. Fruits variable in shape, spherical, ovoid, elongate or contorted.

Commonly cultivated for its fruit in the villages abutting Jamuna River, on sandy beds and along canal banks.

Local name: Kharbuza; English name: Musk melon

Flowers and Fruits: June-Sept.

J. K. Maheshwari 680

Fruits cylindrical, bursting spontaneously *C. melo* var. *momordica*

Fruits oval or cylindrical to elongate, not bursting as above *C. melo* var. *utilissimus*

C. melo Linn. var. *momordica* Duthie & Fuller, op. cit. 2 : 50, t. 49, 1883.

It differs in the form and nature of the fruit which is cylindrical, smooth, yellow mottled with dark green, bursting spontaneously. Cultivated.

Local name : Phunt, Kachra

Flowers and Fruits : June-Sept.

J. K. Maheshwari 995, Roshanara Gardens

C. melo Linn. var. *utilissimus* Duthie & Fuller, op. cit. 2 : 55, t. 53, 54, 1883.

C. utilissimus Roxb. Hort. Beng. 70, 1814, nom. nud. & Fl. Ind. 3 : 721, 1832.

It differs in the shape of the fruit which varies from oval or cylindrical to elongate, straight or curved, dark green to nearly white, bright orange when ripe.

Local name : Kakri

Flowers and Fruits : April-Sept.

J. K. Maheshwari 681

C. sativas Linn. Sp. Pl. 1012, 1753 FBI. 2 : 620; Duthie & Fuller, op. cit. 2 : 53, t. 51.

A scabrous, trailing or climbing annual. Leaves 3 to 5-lobed, cordate, very rough. Flowers yellow; male ones in axillary clusters and females solitary or fascicled. Fruits ovate or oblong, very variable in size. Seeds numerous, white.

Cultivated.

Local name : Khira

Flowers and Fruits : May-Sept.

Citrullus Schrad. nom. cons.

Fruits globose, very bitter, not exceeding 7.5 cm. in diam.

Fruits subglobose or ellipsoid, usually sweet, up to 25 cm. in diam. *C. colocynthis*

. *C. vulgaris*

C. colocynthis (Linn.) Schrad. in Linnæa 12 : 414, 1838; FBI. 2 : 620

Duthie & Fuller, op. cit. 2 : 57

Cucumis colocynthis Linn. Sp. Pl. 1011 1753

A perennial, trailing, scabrid herb. Leaves ovate or triangular in outline, deeply 3-lobed lobes sinuately pinnatifid. Flowers yellow. Fruits globose, striped with dark green and white pulp spongy, very bitter.

Grows commonly in the sandy tracts near Najafgarh, Khera, Nangloi

and Narela. The fruit is used medicinally. Said to be a strong purgative and in dried form used for stomach troubles.

Local name : Gadumba ki bel ; Indrayan ; Kaur-tumba ; Phar-

pendua
Flowers : May-July. Fruits : Aug.-Oct.

J. K. Maheshwari 998 ; 1209, Najafgarh

- C. vulgaris* Schrad. ex Eckl. & Zeyh. Enum. 2 : 279, 1836 ; FBI. 2 : 621 ; Duthie & Fuller, op. cit. 2 : 56, tt. 55, 56.
Cucurbita citrullus Linn. Sp. Pl. 1010, 1753.

A climbing or trailing, hispid annual. Leaves divided or lobed, or mottled ; pulp white, yellowish or red.
Cultivated for its cool and refreshing fruits.

Local name : Tarbooz ; Tarbuza ; English name : Water melon

Fruits : June-July

J. K. Maheshwari 1445

- C. vulgaris* Schrad. var. *fistulosus* Duthie & Fuller, op. cit. 2 : 46, t. 47, 1883 ; FUGP. 1 : 375.

Citrullus fistulosus Stocks in Hook. Kew. Jour. 3 : 74, t. 3, 1851.

Distinguished from the main species by its fistulous stems and petioles. Fruits depressed at each end, light apple-green.

Cultivated. The fruit is used as pickle and vegetable.

Local name : Tinda ; Tendu ; Tensi

Flowers and Fruits : Rainy season

J. K. Maheshwari 678

Coccinia Wt. & Arn.

- C. cordifolia* (Linn.) Cogn. in DC. Mon. Phan. 3 : 529, 1881.

Bryonia cordifolia Linn. Sp. Pl. 1012, 1753.

Coccinia indica Wt. & Arn. Prodr. 347, 1834.

Cephalandra indica Naud. in Ann. Sc. Nat. (sér. 5) 5 : 16, 1866 ; FBI. 2 : 621.

A pretty, twining or spreading shrub. Leaves 3 to 5-lobed or angled, cordate, shining ; margins distantly glandular-tipped. Flowers white. Fruits fleshy, ovoid or oblong, bright red when ripe. Seeds embedded in red pulp.

Common throughout, spreading or twining rather vigorously on trees and shrubs. The green fruits are used in curries and said to be useful for diabetes. The ripe fruit is eaten as such. Parrots and snakes are said to like it.

Local name : Kundru ; Kanduri ; Kutru ; Ram kachriya

Flowers : March-Oct. Fruits : Oct.-Dec.
J. K. Maheshwari 75, Roshanara Gardens

Cucurbita Linn.

Leaves soft ; calyx tube very short or none, segments foliaceous at the tips *C. moschata*

Leaves rigid ; calyx tube campanulate, segments subulate, fleshy ; *C. maxima*

Lobes of leaf rounded, non-sinuate ; peduncle terete *C. pepo*

Lobes of leaf acute, deep-sinuate ; peduncle angled *C. pepo*

C. moschata Duch. ex Poir. in Dict. Sc. Nat. 11 : 234, 1818 ; FBI. 2 : 622 ; Duthie & Fuller, op. cit. 2 : 58, t. 58.

Leaves 5 to 7-lobed. Flowers solitary, large, yellow. Fruits of variable shape, cylindric, ovoid, clavate or subglobose, with a glaucous bloom when ripe.

Cultivated.

Local name : Sitaphal ; Mitha kaddu

Flowers and Fruits : Rainy season

C. maxima Duch. in Lamk. Encycl. 2 : 151, 1786 ; FBI. 2 : 622 ; FUGP. 1 : 377.

Leaves circular to reniform in outline. Flowers yellow. Peduncle short, spongy, not expanded at the attachment.

Local name : Sitaphal ; Kaddu ; English name : Red gourd or Red pumpkin

C. pepo Linn. Sp. Pl. 1010, 1753 ; Bailey, Man. Cult. Pl. 952.

Hispid-hairy annual. Leaves usually prominently lobed. Flowers yellow. Peduncle angled, expanded at the top. Fruits large, furrowed.

Cultivated.

Local name : Vilaiti kaddu ; English name : Squash or Vegetable marrow

49. Cactaceae

Opuntia Mill.

Spines pale yellow, some curved *O. dillenii*
Spines tawny-brown or black, all straight *O. elatior*

O. dillenii Haw. Pl. Succ. 79, 1812 ; FBI. 2 : 657 ; Burkill in RBSI. 4(6) : 314, 1911.

A thorny bush, up to 2 m. tall. Branches jointed ; joints more or less obovate. Flowers yellow or tinged with red. Berries purple, pear-shaped, truncate.

Native of S. America. Introduced on the Ridge and in the plains where it has become naturalized and at places forms dense thickets. Used for hedging.

Local name : Nagphani
Flowers : March-May

O. elatior Mill. Gard. Dict. n. 4, 1768 ; Burkill, op. cit. 313.
A tall, much-branched cactus. Phylloclades obovate, pale green.
Spines dark-coloured. Flowers dark yellow, fading to pink. Berries
red.
Burkill (loc. cit.) found this species growing commonly about Delhi.
It was probably introduced by Anderson who sent it to Roxburgh in
India.

Local name : Nagphani

50. Molluginaceae

Carpels apocarpous *Gisekia*
Carpels syncarpous : *Glinus*
Flowers in axillary fascicles ; seeds appendaged *Glinus*
Flowers in terminal cymes ; seeds minutely appendaged or not *Mollugo*

Gisekia Linn.

G. pharnaceoides Linn. Mant. 562, 1771 ; FBL. 2 : 664 ; FUGP. 1 : 388.
A prostrate or ascending herb, up to 20 cm. tall. Branches
subflexuose. Leaves 1.2-3 × 0.4-0.8 cm., linear, subfleshy. Flowers
small, yellowish, in lax, terminal and axillary cymes.

Occurs on hard, dry, sandy-clayey soil which is known locally as
'Dumat'. I collected this plant from the fallow fields of Najafgarh and
Shahdara. Occasionally it is found on the lawns and along roadsides
in sandy places.

Flowers and Fruits : July-Sept.

J. K. Maheshwari 235, Shahdara ; 289, Okhla

Glinus Linn.

Plant densely stellate-hairy *G. lotoides*
Plant glabrous *G. oppositifolius*

G. lotoides Linn. Sp. Pl. 463, 1753.

Mollugo lotoides Kuntze, Rev. Gen. 264, 1891.

M. hirta Thunb. Prodr. Pl. Cap. 24, 1794 ; FBL. 2 : 662 ; FUGP.
1 : 386.

A prostrate or ascending, stellately hairy, annual herb. Branches
radiating in all directions, 15-45 cm. long. Leaves opposite or in whorls
of 3-5, suborbicular, obovate or elliptic. Flowers green, 2-6, in subla-

teral fascicles. Calyx enlarging in fruit. Petals absent. Styles 5. Capsules 4×3.5 mm. Seeds dark brown, tubercled, with a scaly, white appendage.

Common on hard, black and clayey soils in dry ditches and canals. In dried ponds and puddles it often produces a dense pure felt. During the hot dry month of June, it grows in association with *Grangea maderaspatana* Poir., *Coldenia procumbens* Linn., *Polygonum plebeium* R. Br. and *Polycarpon prostratum* Pax in the dried up canals and fields of Najafgarh Drain. Occasional on the Ridge.

Flowers and Fruits : April-July

J. K. Maheshwari 861, near Jamuna River

G. oppositifolius (Linn.) DC. in Bull. Herb. Boiss, II, 1 : 559, 1901.

Mollugo oppositifolia Linn. Sp. Pl. 89, 1753 ; FUGP. 1 : 387.

M. spargula Linn. Syst. 881, 1759 ; FBI. 2 : 662.

A trailing or diffuse, much-branched, glabrous herb. Stems leafy. Leaves $10-25 \times 5-10$ mm., usually in whorls, spatulate, obovate or elliptic. Flowers white, 5 mm. across, on slender pedicels, clustered at the nodes. Stigmas 3. Capsules 3-celled. Seeds deep brown, tuberculate, with a small, white scale curved around them.

Not common in the area. Found on moist or somewhat dry, sandy or clayey soils of fallow and cultivated fields.

Flowers and Fruits : July-Sept.

J. K. Maheshwari 270, low lands of Najafgarh

Mollugo Linn.

Leaves linear or whorled at the nodes *M. cerviana*
Leaves radical *M. nudicaulis*

M. cerviana (Linn.) Ser. in DC. Prodr. 1 : 392, 1824 ; FBI. 2 : 663 ; FUGP. 1 : 387.

Pharnaceum cerviana Linn. Sp. Pl. 272, 1753.

An erect, slender, small, glabrous herb. Branches umbellate. Leaves $10-20 \times 1$ mm., in whorls of 4-8 at each node. Flowers in umbellate or trichotomous cymes. Sepals persistent. Capsules pale brown, globose, many-seeded ; dehiscence by 3 valves. Seeds pale or deep brown, reticulate, bluntly ridged on the back.

Common in moist or dry situations on waste lands and in cultivated fields.

Flowers and Fruits : July-Sept.

J. K. Maheshwari 337, Hauz Khas

M. nudicaulis Lamk. Encycl. 4 : 234, 1797 ; FBI. 2 : 664 ; FUGP. 1 : 388.

A glabrous, shallow-rooted herb. Stems bare. Leaves radical, forming a rosette on the ground, elliptic or oblong-spathulate, 1-1.5 cm. Flower buds dull purple in colour. Flowers dull white, 3 × 4 mm., in di- and trichotomous cymes. Capsules brown. Seeds black, closely reticulate, minutely appendaged at the hilum.

Common on gravelly, reddish-brown and sandy, moist soils, collected from the sides of the railway lines at Azadpur on gravelly soil; common also in the University Grounds during the rains.

Local name : Gobi

Flowers and Fruits : July-Oct.

J. K. Maheshwari 389 ; 699

51. Aizoaceae (Ficoidaceae)

Trianthema Linn.

Stamens 5 :

Flowers rosy-pink ; styles 2

Flowers greenish ; style 1

Stamens 10-20 ; flowers pinkish or white ; style 1

T. govindia Buch.-Ham. ex G. Don, Gen. Syst. 3 : 72, 1834 ; Melville in

Kew Bull. 264, 1952.

T. pentandra auct. plur. (non Linn.).

A prostrate, deep-rooted herb, many-branched from a common base. Branches often dull pink in tinge. Leaves 1-2 × 1-1.7 cm., subsucculent. Flowers rosy-pink, in subsessile, axillary clusters. Styles 2. Stigmas recurved. Capsules 4 × 3 mm. Seeds black, dull.

Common in dry, waste places of the area and on the Ridge. Often unassociated with other herbs. The pink-coloured young fruits are attractive.

Local name : Santhi

Flowers and Fruits : June-Sept.

J. K. Maheshwari 380 1171

T. crystallina (Forsk.) Vahl, Symb. Bot. 1 32 1790 FBI 2 660 FUGP. 1 : 385.

Papularia crystallina Forsk. Fl. Aegypt.-Arab. 69, 1775.

A mat-forming, prostrate, perennial herb with a long root system. Stems dichotomous, caespitose. Leaves 5-10 × 1.5-3 mm., succulent. Flowers solitary or in twos or threes in the axils or in the forks of the branchlets. Stamens 5. Style 1, reddish. Capsules 2-3 × 1.5 mm., 2-seeded. Seeds discoid, black.

Common during the pre-monsoon as well as during the monsoon days forms a green carpet on sandy, dry soils. The plant can serve as an efficient sand binder due to this characteristic habit.

Local name : Nonka ; Machechi
Flowers and Fruits : May-Dec.
J. K. Maheshwari 561, Azadpur ; 863

T. portulacastrum Linn. Sp. Pl. 223, 1753 ; Gamble, Fl. Pres. Mad. 550.
T. monogyna Linn. Mant. 69, 1767 ; FBI. 2 : 660 ; FUGP. 1 : 385.

A prostrate, glabrous or puberulous, succulent herb. Stems often tinged purplish. Leaves unequally paired ; petiole dilated into a sheath at its base. Flowers pinkish, solitary, in pouch-like petiolar sheaths. Anthers pink or white. Style solitary. Capsules 5×3 mm., breaking transversely into an upper coriaceous lid and a lower membranous cup. Seeds dull black.

Abundant in wet, cultivated fields as well as in waste, dry or moist places, where it spreads aggressively. Occurs on the Ridge as a herbaceous undergrowth. White flowers also occur in this species.

Local name : Santh ; Santhi
Flowers and Fruits : June-Dec.
J. K. Maheshwari 72 ; 1254

52. Umbelliferae (Apiaceae)

Leaves simple ; umbels simple ; flowers pink *Centella*
Leaves compound ; umbels compound :

Primary ridges of fruit conspicuous ; secondary ridges inconspicuous or absent :

Fruits laterally compressed *Trachyspermum*

Fruits not laterally compressed but oblong, ellipsoid or subglobose :

Flowers yellow ; ultimate leaf segments linear :

Fruits oblong or ellipsoid, the ribs not winged . . . *Foeniculum*

Fruits dorsally compressed and narrowly winged . . *Anethum*

Flowers white ; ultimate leaf segments not linear . . *Oenanthe*

Secondary ridges of fruit prominent :

Fruits bristly *Daucus*

Fruits glabrous :

Fruits subglobose ; bracts absent *Coriandrum*

Fruits cylindric ; bracts linear *Cuminum*

Centella Linn.

C. asiatica (Linn.) Urban in Mart. Fl. Bras. 11 : 287, 1879 ; Fyson, Fl. Nilgiri & Pulney Hill-tops 3 : 346 ; Santapau in RBSI. 16(1) : 124, 1953.

Hydrocotyle asiatica Linn. Sp. Pl. 234, 1753 ; FBI. 2 : 669 ; FUGP. 1 : 391.

A creeping herb, rooting at the nodes. Leaves several at each node,

fan-shaped or reniform, on long petioles, 5-10 × 10-20 mm. Flowers small, pink, in clusters of umbels. Fruits 2-seeded, indehiscent, laterally compressed. Seeds brown, dull, oblong.

Common and abundant along the irrigation channels crossing the fruit orchards as well as the suburbs, forming a mat-like growth. Used as an antidote to cholera and heat effects and also to cure madness. It may cause influenza, if taken in winter.

Local name : Brahmi

Flowers and Fruits : April-July

J. K. Maheshwari 1103, Azadpur Road, near railway lines

Trachyspermum Link nom. cons.

T. ammi (Linn.) Sprague in Kew Bull. 228, 1929.

Sison ammi Linn. Sp. Pl. 252, 1753, in part.

Carum copticum Hiern in Oliver, Fl. Trop. Africa 3 : 12, 1871 ; FBI. 2 : 682 ; FUGP. 1 : 394.

An erect annual, up to 1 m. tall. Leaves 2 to 3-pinnate. Flowers white, in compound umbels. Cremocarps about 1 × 1 mm., ovoid, muricate, compressed.

Cultivated for its fruits which are much used in local medicines and as a spice.

Local name : Ajwain

Flowers and Fruits : Nov.-March

J. K. Maheshwari 1345

Foeniculum Adans.

F. vulgare Mill. Gard. Dict. n. 1, 1768 ; FBI. 2 : 695 ; FUGP. 1 : 394.

A glabrous herb. Leaves 2 to 4-pinnate ; segments thread-like. Flowers yellow, in compound umbels. Fruits oblong or ellipsoid, ribbed.

Cultivated for its fruits and seeds which are used as condiment.

Local name : Sonf ; English name : Fennel

Flowers and Fruits : Jan.-March

J. K. Maheshwari 1364

Anethum Linn.

A. graveolens Linn. Sp. Pl. 263, 1753.

Peucedanum graveolens Hiern in Oliver, Fl. Trop. Africa 3 : 19, 1871 ;

FBI. 2 : 709 ; Duthie & Fuller, Field & Gard. Crops 3 : 45, t. 90.

A glabrous, branched, perennial herb. Leaves finely dissected, fennel-like. Flowers yellow. Fruits narrowly winged, 4 × 2 mm.

Cultivated for its fruits and seeds which are used in preparing curries.

The foliage are also used as a flavouring agent. Also met as an escape in moist, waste places.

Local name : Sowa
Flowers and Fruits : Jan.-March
J. K. Maheshwari 35

Oenanthe Linn.

O. javanica (Bl.) DC. Prodr. 4 : 138, 1830 ; Buwalda in Fl. Males. ser. 1, 4(2) : 136, 1949.

Sium javanicum Bl. Bijdr. 15 : 881, 1826.

Oenanthe stolonifera DC. Prodr. 4 : 138, 1830 ; FBI. 2 : 696 ; FUGP. 1 : 395.

A stoloniferous, glabrous, fistular herb, 45-80 cm. high, decumbent. Leaves uni- to bipinnate ; petiole sheathed ; rachis flat or subterete. Flowers white, fragrant, in compound umbels. Carpels small, dorsally compressed, ridged, 3×1 mm.

Occurs in wet or muddy places along the small water channels of Delhi Canal which passes through the fruit orchards of the district. Met commonly along the canal bank running on either side of the railway line from Delhi to Azadpur and the neighbouring gardens.

Flowers and Fruits : April-May

J. K. Maheshwari 110, Azadpur (Railway Chowki 4, 21-Bigah Bagh)

Daucus Linn.

D. carota Linn. Sp. Pl. 242, 1753 ; FBI. 2 : 718 ; Duthie & Fuller, op. cit. 3 : 9, t. 78.

A hispid, much-branched herb. Leaves pinnately decomposed. Flowers white, numerous, in showy, compound umbels ; outer flowers zygomorphic. Fruits bristly along the secondary ridges, about 4×1 mm.

Extensively grown as a cold season crop for its fleshy, edible roots.

Local name : Gajar ; English name : Carrot

Flowers and Fruits : Jan.-March

J. K. Maheshwari 1363

Coriandrum Linn.

C. sativum Linn. Sp. Pl. 256, 1753 ; FBI. 2 : 717 ; Duthie & Fuller, op. cit. 3 : 40, t. 76.

A strongly smelling herb. Leaves decomposed. Flowers purplish or white, in compound umbels ; outer ones zygomorphic. Fruits subglobose, ribbed.

Commonly cultivated for its fruits and leaves which are used as

condiment and for flavouring curries. The fruits are also used as flavouring material in confectionery. Also found as an escape in waste places.

Local name: Dhania; English name: Coriander
Flowers and Fruits: Dec.-April
J. K. Maheshwari 1354

Cuminum Linn.

C. cyminum Linn. Sp. Pl. 254, 1753; FBI. 2: 718; Duthie & Fuller, op. cit. 3: 40.

A slender, glabrous annual. Leaves dissected into filiform segments. Flowers white, in few-rayed, compound umbels. Fruits cylindric, ridged, bristly.

Cultivated for its aromatic fruits which are used in flavouring.

Local name: Zira
Flowers and Fruits: Jan.-March
J. K. Maheshwari 1444

53. Caprifoliaceae

Sambucus Linn.

S. nigra Linn. Sp. Pl. 269, 1753; Bailey, Man. Cult. Pl. 935.

A small tree, with prominently lenticellate branches. Leaves 5 to 9-foliolate. Leaflets ovate or elliptic, serrate, glabrous. Flowers in 4-rayed, broad cymes. Fruits globose, dark purple, 5-8 × 5-6 mm.

Planted in the hedges of gardens.

Flowers: Late summer
J. K. Maheshwari 1127

54. Rubiaceae

Erect or prostrate herbs:

Flowers in axillary and terminal, paniculate cymes . . . *Oldenlandia*

Flowers whorled or in axillary heads . . . *Borreria*

Trees; flowers in globose heads . . . *Mitragyna*

Short or tall shrubs:

One calyx lobe expanded into a coloured leaf . . . *Mussaenda*

Calyx lobes not expanded:

Flowers in terminal, trichotomously branched panicles, mauve or white . . . *Hamiltonia*

Flowers solitary, cymose or in corymbose cymes:

Stipules multisetose or multifid; flowers pale purple . . . *Pentas*

- Stipules not as above:
 Leaves usually in whorls of 3; stamens inserted near base of corolla tube; corolla tubular *Hamelia*
 Leaves usually opposite:
 Flowers usually solitary, axillary, white *Gardenia*
 Flowers in dense corymbs, red; corolla salver-shaped *Ixora*

Oldenlandia Linn.

- A slender, diffuse herb; flowers white *O. corymbosa*
 An erect, stout herb; flowers pale blue *O. aspera*

O. corymbosa Linn. Sp. Pl. 119, 1753; FBI. 3 : 64; FUGP. 1 : 413.

A small, prostrate, straggling or ascending herb. Leaves sessile, linear or linear-lanceolate. Stipules bristly. Flowers white, solitary or on 2-flowered peduncles. Capsules didymous, $1.5-2 \times 2$ mm. Seeds angular.

Found in fields and waste places on moist ground. Variable in habit and height. It appears like a species of *Mollugo*.

Flowers and Fruits: Sept.-Oct.

J. K. Maheshwari 1291, Vallabgarh; 1334

O. aspera DC. Prodr. 4 : 428, 1830; FBI. 3 : 68; FUGP. 1 : 415.

An erect, slender herb, up to 45 cm. tall. Branches trichotomous, scabrous. Leaves opposite or fascicled, linear-lanceolate, $4-7 \times 0.4$ cm. Flowers minute, pale blue, in terminal cymes. Capsules 3×3 mm., crowned by 4 calyx teeth. Seeds minute, angular.

A weed in fallow and cultivated fields. Grows on moist, sandy soil and used as fodder.

Local name : Gobi

* Flowers and Fruits : Aug.-Sept.

J. K. Maheshwari 1231, Gurukul Indraprastha Fields (near Faridabad)

Borreria G. F. W. Mey. nom. cons.

- Erect, small herbs; flowers white *B. stricta*
 Procumbent, larger herbs; flowers pale blue or pale violet *B. hispida*

B. stricta (Linn. f.) K. Schum. in Engl. & Prantl, Nat. Pfam. 4(4): 143, 1891; Blatt. in JBNHS. 36 : 794, 1933.

Spermacoce stricta Linn. f. Suppl. 120, 1781; FBI. 3 : 200; FUGP. 1 : 429.

An erect, small herb. Stems short, scabrid with recurved, scabrous hairs. Leaves whorled, ovate-oblong or linear. Stipules united into a

tube, filiform-bristly. Flowers many, in dense, axillary and terminal clusters.

Occurs rarely on the Ridge amongst the crevices of rocks and on reddish-brown sandstones. Often escapes notice by its small size.

Flowers and Fruits : Oct.-Dec.
J. K. Maheshwari 1394, New Delhi Ridge

B. hispida K. Schum. in Engl. & Prantl, Nat. Pfam. 4(4) : 144, 1891;
Blatt. op. cit. 795.
Spermacoce hispida Linn. Sp. Pl. 102, 1753; FBI. 3 : 200; FUGP.
1 : 429.

A procumbent, deep-rooted annual. Branches quadrangular. Leaves decussate, ovate, ovate-oblong or elliptic-oblong, 2.4 x 1.5-2 cm., leathery. Flowers pale blue or pale violet, in nodal whorls, tetramerous, erect. Capsules about 4 x 2 mm., oblong, hairy; both carpels dehiscent ventrally. Seeds oval, dark brown, grooved ventrally.

Comes on the Ridge during the monsoon period. Also found in the plains as a weed in cultivated and unused grounds on damp, sandy soil. Duthie in FUGP. (loc. cit.) reports that one carpel remains indehiscent. I have seen both mericarps to dehisce with one seed in each. Used as fodder.

Local name : Satgathiya; Ghathiyaghas; Gathbhanjan
Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 336, Hauz Khas

Mitragyna Korth. nom. cons.

M. parvifolia (Roxb.) Korth. Obs. Naocl. Ind. 19, 1839; FUGP. 1 : 408;
Parker, For. Fl. 276.

Nauclea parvifolia Roxb. Pl. Cor. 1 : 40, t. 52, 1796.

Stephegyne parvifolia Korth. in Verh. Nat. Ges. 161, 1840; FBI. 3 : 25.

A large or medium-sized, deciduous, sweet-scented tree. Leaves variable in shape and size, orbicular, oval or obovate. Flower heads white or light yellow, about 2.5 x 2.5 cm. Stigma mitriform, white. Cocci 2, dehiscent. Seeds winged.

Probably introduced on the Ridge. Some trees occur on the Old Delhi Ridge near Chauburjha Road. Also planted as a roadside tree along side-lanes of New Delhi. The flowering and fruiting is very quick.

Local name : Kadam

Flowers : Aug.-Sept. Fruits : Cold season

J. K. Maheshwari 278, Old Delhi Ridge

Mussaenda Linn.

M. luteola Delile, Cent. Pl. Méroé 65, t. 62, 1826; Bor & Raiz. 80, f. 50, Pl. 25.

An erect shrub, woody below. Leaves ovate to elliptic, acute to acuminate. Stipules paired, interpetiolar. Flowers yellow, in terminal cymes. One calyx lobe of one or two flowers in each corymb is transformed into a conspicuous, yellow-coloured leaf.

Grown as an ornamental shrub in gardens.

Flowers : March-April; Aug.-Oct.
J. K. Maheshwari 368, University Campus

Hamiltonia Roxb.

H. suaveolens Roxb. Hort. Beng. 15, 1814, nom. nud. & Fl. Ind. 1 : 554, 1832; FBI. 3: 197; FUGP. 1 : 426; Bor & Raiz. 97, f. 62, Pl. 34, 35.

A tall shrub. Leaves ovate, elliptic or lanceolate, rough, coriaceous. Flowers pinkish or bluish, scented, numerous, in terminal, trichotomously branched panicles. Capsules ellipsoid.

Cultivated as an ornamental shrub in gardens and bungalow hedges.

Local name : Bain-champa

Flowers : Dec.-Feb.

J. K. Maheshwari 1365, Talkatora Gardens

Pentas Benth.

P. lanceolata (Forsk.) K. Schum. in Engl. & Prantl, Nat. Pfam. 4(4) : 29, 1891; Bailey, Man. Cult. Pl. 931.

Ophiorrhiza lanceolata Forsk. Fl. Aegypt.-Arab. 42, 1775.

Pentas carnea Benth. in Bot. Mag. t. 4086, 1844.

An erect undershrub, up to 1 m. tall. Leaves ovate or elliptic, tapering at ends. Stipules filiform, with ciliate margins. Flowers bluish-pink or pale purple, in terminal corymbs.

Grown in gardens as an ornamental plant.

Flowers : July-Oct.

J. K. Maheshwari 1366, Sunder Nursery

Hamelia Jacq.

H. patens Jacq. Enum. Pl. Carib. 16, 1760 & Select. Am. 72; Bor & Raiz. 96, f. 61, Pl. 32, 33.

H. erecta Jacq. Enum. Pl. Carib. 16, 1760.

An evergreen, handsome, woody shrub. Leaves whorled, elliptic, obovate or oblanceolate. Stipules interpetiolar. Flowers reddish-yellow, in a corymbose head. Berries ovoid or globose.

Commonly cultivated in gardens and hedges around bungalows.

Flowers : May-Oct. Fruits : Nov.

J. K. Maheshwari 65, University Campus

Gardenia Ellis nom. cons.

G. jasminoides Ellis in Phil. Trans. 51: 935, 1761; Bailey, op. cit. 933.
G. florida Linn. Sp. Pl. 305, 1762.

A shrub, with stout branches. Leaves opposite or ternate, obovate to elliptic, coriaceous. Flowers creamy-white, fragrant, large, solitary or paired.

Cultivated in gardens and hedges around bungalows.

Flowers : Aug.-Sept.

J. K. Maheshwari 710, Rashtrapati Bhavan Campus

Ixora Linn.

I. coccinea Linn. Sp. Pl. 110, 1753; Bor & Raiz. 86, Pl. 28.

A shrub. Leaves oval with cordate, amplexicaul base. Flowers deep red, attractive, in corymbs. Berries hard.

Grown as an ornamental for its flowers.

Flowers April-Aug.

55. Compositae (Asteraceae)

GROUP I. LIGULIFLORAE—Juice milky. Flowers all ligulate.

Tribe 1. *Cichorieae*. Leaves radical or alternate. Heads homogamous. Involucral bracts membranous. Anther bases sagittate, rarely tailed.

Pappus setose, paleaceous or absent.

Pappus extremely short, of reddish or green scales . . . 1. *Cichorium*

Pappus of simple hairs :

Achenes usually beaked, narrowed at the ends :

Heads yellow; achenes fusiform; beaks short . . . 2. *Youngia*

Heads yellow, pink or blue; achenes compressed or flattened, beaked; plants cultivated . . . 3. *Lactuca*

Achenes not beaked; pappus white, soft and silky:

Achenes columnar, truncate at both ends; heads cylindric . . . 4. *Launaea*

Achenes compressed, ovoid or obovoid; heads ovoid, campanulate or cylindric . . . 5. *Sonchus*

GROUP II. TUBULIFLORAE—Juice watery; disc florets tubular.

Tribe 1. *Vernonieae*. Flowers all bisexual and tubular, never yellow.

Anthers cleft at the base. Heads distinct, many-flowered. Pappus long, copious . . . 6. *Vernonia*

Tribe 2. *Eupatorieae*. Differs from above in having anthers blunt at the base.

Heads in dense, terminal corymbs; anthers appendaged at the apex . . . 7. *Ageratum*

Tribe 3. *Astereae*. Disc florets yellow; all or only the central flowers tubular; anthers blunt at base.

Heads golden-yellow, in unilateral racemes forming a panicle 8. *Solidago*

Heads not as above :

Prostrate, tufted herbs; leaves sinuately pinnatifid 9. *Grangea*

Erect herbs; leaves entire, toothed or cut :

Ray florets ligulate, not yellow 10. *Erigeron*

Florets yellow; ray florets usually tubular 11. *Conyza*

Tribe 4. *Inuleae*. Differs from *Astereae* in anthers tailed (except *Laggera*).

Heads homogamous, sessile, with two large bracts; marshy herbs

. 12. *Caesulia*

Heads heterogamous :

Heads rayed :

Pappus in a single row, scanty or absent 13. *Vicoa*

Pappus double-rowed, outer scaly 14. *Pulicaria*

Heads not rayed :

Hoary or woolly herbs; heads corymbose or fascicled

. 15. *Gnaphalium*

Hoary-pubescent or villous herbs; heads corymbose or paniculate :

Herbs, often aromatic; bracts narrow :

Anther bases tailed

. 16. *Blumea*

Anther bases not tailed

. 17. *Laggera*

Robust herbs or undershrubs; bracts broad

. 18. *Pluchea*

Tribe 5. *Heliantheae*. As in *Astereae* but the style branches, each with a crown of hairs below the stigma; receptacle with chaffy bracts.

Heads monoecious; achenes 2 to each head 19. *Xanthium*

Heads heterogamous; achenes many to each head :

Small herbs, with narrowly linear leaf segments 20. *Glossocardia*

Erect or prostrate herbs and undershrubs, with leaves not as above:

Pappus absent

. 21. *Eclipta*

Pappus of 2-4, persistent, spreading awns; ray florets sterile

. 22. *Bidens*

Pappus plumose or of scales, bristles or awns :

Ligules of ray florets small, white; pappus of 2-5 bristles

. 23. *Blainvillea*

Ligules of ray florets large, whitish, cream-coloured or yellow:

Ray florets sterile (rarely fertile in *Viguieria*), yellow, conspicuous :

Achenes pubescent

. 24. *Viguieria*

Achenes glabrous

. 25. *Helianthus*

Ray florets fertile (rarely neutral in *Verbesina*) :

Herbs; pappus of feathery bristles; ligules of ray florets

whitish or cream-coloured
 Shrubs; pappus of 2 awns, sometimes 1-3 or 0 . . . 26. *Tridax*

Tribe 6. *Anthemideae*. As in *Heliantheae*, but the receptacle is bractless;
 the involucre bracts with membranous tips; pappus none. . . 27. *Verbesina*

Small herbs; heads solitary, on long peduncles . . . 28. *Cotula*

Large herbs or shrub-like; heads in panicles . . . 29. *Artemisia*

Tribe 7. *Cynareae*. Leaves often spinous. Flowers all tubular.
 Involucre bracts often with spinous tips. Receptacle mostly bristly.
 Heads 1-flowered, crowded in spinous, globose clusters . . . 30. *Echinops*

Heads many-flowered, separate :
 Heads yellow or orange-yellow; pappus absent . . . 31. *Carthamus*

Heads purplish, violet or blue:
 Erect, robust herbs:
 Leaves very spinous; pappus soft, feathery . . . 32. *Cirsium*

Leaves hardly spinous; pappus of plumose bristles . . . 33. *Cynara*

Straggling herbs; heads pale purple . . . 34. *Volutarella*

Tribe 8. *Mutisieae*. Ray and usually disc florets bilabiate.
 White tomentose herbs; involucre bracts spinescent . . . 35. *Dicoma*

The following artificial key is provided to facilitate quick determination of the genera.

1. Flowers white, whitish or creamy :
 2. Heads compound, with two large bracts ; marshy herbs . . . 12. *Caesulia*
 2. Heads simple and not as above :
 3. Male and female heads separate; the latter 2-flowered . . . 19. *Xanthium*
 3. Male and female heads not separate :
 4. Leaves compound; pappus of 2-4, spreading awns . . . 22. *Bidens*
 4. Leaves simple :
 5. Involucre bracts spinescent ; heads sessile . . . 35. *Dicoma*
 5. Involucre bracts not spinescent ; heads short or long-peduncled :
 6. Pappus absent or of a few, minute teeth; ligule of ray florets small . . . 21. *Eclipta*
 6. Pappus of 2-5 bristles ; heads heterogamous; ligules of ray florets small . . . 23. *Blainvillea*
 6. Pappus of 5 scales; heads homogamous . . . 7. *Ageratum*
 6. Pappus scales awned and plumose; ligules of ray florets large . . . 26. *Tridax*

1. Flowers pale yellow, yellow, orange-yellow or greenish-yellow :
 7. Heads homogamous :
 8. Leaf margins and involucre spinose. 31. *Carthamus*
 8. Leaf margins and involucre without spines :
 9. Leaves radical and cauline, more or less spinulose-serrate; stems stout, fistular; heads subcorymbose . . . 5. *Sonchus*
 9. Leaves chiefly radical or stems slender and erect, spreading or procumbent :
 10. Leaves often prominently crisped; achenes beaked; species cultivated 3. *Lactuca*
 10. Leaves not crisped; achenes not beaked; species wild :
 11. Heads small, below 8 mm. across, corymbosely arranged 2. *Youngia*
 11. Heads larger, above 10 mm. across, racemose or paniculate 4. *Launaea*
 7. Heads heterogamous :
 12. Leaves deeply pinnatisect or dissected into filiform or very narrowly linear segments :
 13. A tall herb, 1-1.8 m. high; heads minute, arranged in a panicle 29. *Artemisia*
 13. Small herbs, up to 20 cm. high; heads usually solitary, axillary and terminal :
 14. Pappus of two, spreading awns 20. *Glossocardia*
 14. Pappus copious, of setose hairs; heads showy, above 1 cm. in diam. 36. *Hymenatherum*
 14. Pappus scarce or shortly ear-shaped; heads not showy, below 1 cm. in diam. 28. *Cotula*
 12. Leaves not divided :
 15. White-woolly or woolly herbs; leaves woolly or not or only beneath :
 16. Heads crowded into corymbose or ovoid clusters 15. *Gnaphalium*
 16. Heads solitary, not clustered :
 17. Plants shrubby; heads above 2.5 cm. in diam. 27. *Verbesina*
 17. Plants herbaceous; heads up to 2.5 cm. in diam. :
 18. Habit erect; leaves broad auriculate at the base; heads above 1 cm. in diam. 13. *Vicoa*
 18. Habit diffuse or ascending; leaves half-amplexicaul or not; heads below 1 cm. in diam. 14. *Pulicaria*
 15. Glabrous or pubescent herbs and shrubs :
 19. Heads in unilateral racemes forming a panicle, golden-yellow; species introduced 8. *Solidago*

19. Heads not as above :
 20. Roots tuberous; tubers edible 25. *Helianthus*
 20. Roots not tuberous :
 21. Shrubs :
 22. Rays pistillate, rarely neutral; achenes flat, compressed, margined, thin-edged or winged 27. *Verbesina*
 22. Rays sterile; achenes not winged nor very flat, when flattened, not margined nor sharp-edged 24. *Viguiera*
 21. Herbs or undershrubs :
 23. Pappus cupular; prostrate, leafy herbs 9. *Grangea*
 23. Pappus of 2-4, spreading awns; erect herbs 22. *Bidens*
 23. Pappus distinct, of few or several hairs or bristles :
 24. Anther bases sagittate or tailed :
 25. Leaves broadly auricled; heads radiate 13. *Vicoa*
 25. Leaves not at all auricled; heads not radiate 16. *Blumea*
 24. Anthers blunt at base :
 26. Ray florets ligulate, not yellow 10. *Erigeron*
 26. Florets yellow; ray florets usually tubular 11. *Conyza*
 1. Flowers pale or bright blue :
 27. Plants with spinous leaves; heads 1-flowered, crowded in spinous, globose clusters 30. *Echinops*
 27. Plants unarmed; heads many-flowered :
 28. Sap milky; leaves stem-clasping 1. *Cichorium*
 28. Sap watery; leaves not stem-clasping 33. *Cynara*
 1. Flowers pink, rosy-pink, lilac to purplish or very faintly pinkish-purple :
 29. Leaf margins and (or) involucre bracts spinose, spinescent or awned :
 30. Habit erect; leaves woolly beneath 32. *Cirsium*
 30. Habit straggling or diffuse; leaves not woolly beneath 34. *Volutarella*
 29. Leaf margins or involucre bracts not spine-tipped :
 31. Heads homogamous :
 32. Leaves at least the lower ones opposite; pappus scales 5 7. *Ageratum*

32. Leaves alternate; pappus of several hairs 6. *Vernonia*
 31. Heads heterogamous :
 33. Hairy or hirsute herbs, not aromatic; anthers blunt at base 11. *Conyza*
 33. Hoary-pubescent or villous herbs, aromatic or not; anthers tailed or sagittate :
 34. Herbs or shrubaceous, often aromatic; bracts narrow; 17. *Laggera*
 35. Leaves decurrent; anther bases sagittate, not tailed 16. *Blumea*
 35. Leaves not decurrent; anther bases tailed 18. *Pluchea*
 34. Undershrubs or shrubs; bracts broad

1. *Cichorium* Linn.

C. intybus Linn. Sp. Pl. 813, 1753; Bailey, Man. Cult. Pl. 983.

An erect or prostrate, hispid herb. Latex white. Leaves oblanceolate or broad-lanceolate, stem-clasping; basal leaves usually pinnately divided; upper ones undivided or lobed. Heads bright blue, sessile, homogamous. Achenes glabrous. Pappus extremely short, scaly.

Native of Europe and found wild in N.W. Himalaya from 1.2-3.3 km. Found mixed in the fields of winter season crops, often as an escape.

Local name : Kasni

Flowers : April-May

J. K. Maheshwari 1019, Gaushala Agricultural Farm (Azadpur)

2. *Youngia* Cass.

Y. japonica (Linn.) DC. subsp. *japonica*

Crepis japonica (Linn.) Benth. Fl. Hongk. 194, 1861.

Prenanthes japonica Linn. Mant. 107, 1767.

An erect, slender herb. Leaves mostly radical and rosette-forming, sinuately lobed or pinnatifid, membranous, 6-15 × 2-4 cm. Floral shoots slender, erect, corymbosely branched near the top. Heads up to 6 × 9 mm., yellow, homogamous. Achenes reddish-brown. Pappus silvery.

Occurs in moist shady places of gardens. Also found in the crevices among stones of embankments.

Flowers and Fruits : Feb.-May

J. K. Maheshwari 620, Roshanara Gardens; 1013, Azadpur Road, near railway lines

3. *Lactuca* Linn.

L. sativa Linn. Sp. Pl. 795, 1753; Bailey, Man. Cult. Pl. 984.

An erect, annual, leafy herb. Radical leaves variable; cauline ones auriculate. Heads yellow, in long, irregular panicles.

Grown as garden vegetable for its crisp, edible, radical leaves. Available in the market from October to March. The cultivars 'Cabbage type' and 'Erect upright cos' are grown in the area.

Local name : Salad

Flowers : Feb.-May

J. K. Maheshwari 1397

4. *Lamnaea* Cass.

Heads terminal, on paniculately branched floral shoots

Heads in racemes, on floral shoots and its branches . . . *L. asplenifolia*

. . . *L. nudicaulis*

L. asplenifolia Hook. f. in FBI. 3 : 415, 1881 ; FUGP. 1 : 494.

A perennial, glabrous herb. Leaves sinuately lobed or pinnatifid. Floral shoots many from the base, paniculately branched. Heads paniculate. Achenes columnar.

Common in cultivated and fallow fields and in waste places on dry, gravelly soils. It is heavily infected by a rust, *Puccinia butleri* Syd., the orange-coloured pustules of which can be seen during the months of February and March especially in the trans-Jamuna fields.

Local name : Gobi

Flowers and Fruits : Winter season

J. K. Maheshwari 155

L. nudicaulis Hook. f. in FBI. 3 : 416, 1881 ; FUGP. 1 : 494.

A glabrous herb, with radical leaves. Latex yellow. Floral shoots spreading, usually naked. Leaves sinuately lobed or pinnatifid; teeth white. Heads more or less subracemose, yellow. Achenes columnar, ribbed, much shorter than the pappus.

Common all over the area in waste localities.

Local name : Gobi

Flowers and Fruits : Sept.-March

J. K. Maheshwari 836 ; 912, New Delhi Ridge

5. *Sonchus* Linn.

Involucral bracts glandular ; achenes transversely rugose . . . *S. arvensis*

Involucral bracts more or less glabrous :

Leaves sharply dentate or spinous-dentate; auricles appressed . . . *S. asper*

Leaves with small teeth; auricles spreading . . . *S. oleraceus*

S. arvensis Linn. Sp. Pl. 793, 1753 ; FBL. 3 : 414 ; FUGP. 1 : 493.

A perennial, erect herb, 60-100 cm. tall. Stems hollow, umbellately branched, glandular-hairy above. Heads pale yellow to yellowish-white, umbellately corymbose. Peduncles and bracts glandular-hairy. Achenes ribbed, transversely rugose, brown.

Common in waste places and fields. The latex is said to be used in eye troubles.

Local name : Gubbi ; Pili dudhi

Flowers and Fruits : Dec.-March

J. K. Maheshwari 802

S. asper (Linn.) Hill, Brit. Herb. 1 : 47, 1756 ; FBL. 3 : 414 ; FUGP. 1 : 493.

Sonchus oleraceus var. *asper* Linn. Sp. Pl. 794, 1753.

An erect herb. Leaves entire, runcinate or pinnatifid, half-amplexicaul, sharply dentate or spinose-dentate. Heads in umbellate cymes. Achenes 3-ribbed on each face.

Occurs in waste places.

Flowers and Fruits : Cold season

S. oleraceus Linn. Sp. Pl. 794, 1753 ; FBL. 3 : 414 ; FUGP. 1 : 492.

An erect annual, 60-100 cm. tall. Stems glaucous. Leaf auricles spreading. Heads borne in umbellate cymes. Achenes 3-ribbed on each side, muriculate.

Common in fields and waste places.

Local name : Pili dudhi

Flowers and Fruits : Cold season

6. *Vernonia* Schreb. nom. cons.

V. cinerea (Linn.) Less. in Linnaea 4 : 291, 1829 & 6 : 673, 1831 ; FBL. 3 : 233 ; FUGP. 1 : 441 ; Merr. Enum. 3 : 592.

Conyza cinerea Linn. Sp. Pl. 862, 1753.

An erect, variable herb. Leaves ovate to lanceolate. Heads pink, rosy-pink or lilac, in corymbs, homogamous, small, about 1×0.7 cm. Achenes terete, hairy. Pappus white.

Common throughout on wet or dry soils. Occurs on the Ridge in the crevices of stones. During the monsoon months this plant is erect, up to 1 m. tall ; after the monsoon it is a small plant with a more diffuse habit.

Flowers and Fruits : Rainy and winter seasons

J. K. Maheshwari 328 ; 348

7. *Ageratum* Linn.

A. conyzoides Linn. Sp. Pl. 839, 1753 ; FBL. 3 : 243 ; FUGP. 1 : 443 ; Merr. Enum. 3 : 597.

An erect, hairy, annual herb, 30-60 cm. tall. Stems often purplish. Leaves broadly ovate, crenate. Heads white, or very pale blue, or very faintly pinkish-purple, fragrant, discoid, in terminal corymbs. Pappus scales 5. Achenes angled, black.

Common especially along the banks of canals and irrigation channels, often gregarious. Also grows abundantly as a herbaceous undergrowth in the fruit orchards of Sabzimandi on moist, sandy soil, forming a green carpet. Used as cattle fodder.

Local name : Nilam ; Tambakoo ; Bhakumbhar
Flowers and Fruits : Jan.-June

J. K. Maheshwari 103 ; 623, Roshanara Gardens

8. *Solidago* Linn.

S. canadensis Linn. Sp. Pl. 878, 1753 ; Bailey, Man. Cult. Pl. 1005.
A woody shrub. Leaves lanceolate, 3-veined, scabrous hairy, 5-12 cm. Heads 3-5 x 4 mm., bright yellow, in dense, unilateral, recurved, axillary racemes forming a pyramidal panicle.

Grown as a hedge in lawns and along foot-paths in gardens.

English name : Golden rod

Flowers and Fruits : Oct.-Dec.

J. K. Maheshwari 529, University Campus

9. *Grangea* Forst.

G. maderaspatana (Linn.) Poir. Encycl. Suppl. 2 : 825, 1812 ; FBI. 3 : 247 ; FUGP. 1 : 446 ; Merr. Enum. 3 : 599.

Artemisia maderaspatana Linn. Sp. Pl. 849, 1753.

A prostrate, tufted, leafy herb, forming circular patches. Leaves sinuately pinnatifid, thick. Heads yellow, disciform, heterogamous, about 6 x 9 mm. Pappus cupular.

Found on dry, sandy-clayey soil and along Jamuna Banks on moist, silty soil.

Flowers and Fruits : Major part of the year

J. K. Maheshwari 159

10. *Erigeron* Linn.

Heads up to 6 mm. across; achenes glabrous *E. canadensis*
Heads above 6 mm. across, usually about 12 mm. ; achenes laxly hairy
. *E. bonariensis*

E. canadensis Linn. Sp. Pl. 863, 1753; FBI. 3 : 254; FUGP. 1 : 447.

An erect, much-branched, stout, hairy herb, up to 1 m. tall. Leaves 3-8 x 0.3-0.5 cm., narrowly linear. Heads heterogamous, 3-4 x 4-6 mm., in branched panicles, yellowish. Achenes flat, glabrous.

Occurs in moist, shady places and waste grounds near fruit orchards and fields.

Flowers and Fruits : May-July

J. K. Maheshwari 109, Sarai Rohilla Gardens

E. bonariensis Linn. Sp. Pl. 863, 1753 ; Burtt in Kew Bull. 371, 1948.

E. linifolius Willd. Sp. Pl. 3 : 1955, 1803.

An erect, stout, deep-rooted, hirsute herb, 30-90 cm. tall, usually branching somewhat above the ground. Stems and branches with crowded, ascending leaves. Leaves $4-10 \times 0.5-0.8$ cm., linear, entire. Heads numerous, 6×12 mm., in corymbose panicles, heterogamous. Ray florets whitish. Corolla of disc florets pale yellow. Achenes oblong, slightly curved, brown, loosely hairy.

Grows more or less gregariously in gardens, lawns and along roadsides and gives a characteristic appearance to the grassy grounds by its erect habit, closely set leaves and terminal panicles.

Local name : Phulni

Flowers and Fruits : Late summer and rainy seasons

J. K. Maheshwari 918, Timarpur

11. *Conyza* Less. nom. cons.

C. aegyptiaca Dryand. in Ait. Hort. Kew. 3 : 183, 1789 ; FBI. 3 : 258 ; FUGP. 1 : 448.

An erect or procumbent, hirsute herb. Leaves pinnatifidly lobed. Heads corymbose or paniced, heterogamous, disciform, about 1×1 cm. Involucral bracts narrow. Pappus pinkish.

Found along Jamuna Banks in moist soil.

Flowers and Fruits : Feb.-May

J. K. Maheshwari 1010

12. *Caesulia* Roxb.

C. axillaris Roxb. Pl. Cor. 1: 64, t. 93, 1798; FBI. 3: 291; FUGP. 1: 462.

A prostrate or suberect, marshy herb. Leaves $7-15 \times 1-1.8$ cm., narrowly lanceolate; base auricled. Heads homogamous, axillary, sessile. Bracts 2. Flowers whitish. Achenes flat, one-ribbed on each side.

Occurs in marshy places near canals or in rice fields. Common in the cultivated and fallow fields of village Gheora.

Flowers and Fruits : Oct.-May

J. K. Maheshwari 556, Hindan River Banks

13. *Vicoa* Cass.

Erect, woolly herbs; involucral bracts with recurved tips . . . *V. vestita*
Erect, rigid herbs; involucral bracts erect *V. indica*

V. vestita Benth. ex Hook. f. in F.B.I. 3 : 297, 1881.
Inula vestita Wall. Cat. 2962, 1831, nom. nud.; DC. Prodr. 5 : 470,
 1834; FUGP. 1 : 464.

An erect, woolly, faintly scented herb. Stems reddish. Leaves oblong or linear-oblong, broadly auriculate, 5-10 x 1-2.5 cm. Heads bright yellow, about 0.7 x 2 cm., corymbose, heterogamous, radiate. Achenes oblong-cylindric, sparsely hairy.

Found in waste places and along Jamuna Banks in Khadar area, on moist soil. Also met with on unused grounds near gardens, usually becoming gregarious. Rare on the Ridge.

Flowers and Fruits : Feb.-May
 J. K. Maheshwari 625

V. indica (Willd.) DC. in Wt. Contrib. 10, 1834; Santapau in RBSI. 16(1) : 149, 1953.

Inula indica Willd. Sp. Pl. 3 : 2092, 1803; FUGP. 1 : 464.

Vicoa auriculata Cass. in Ann. Sc. Nat. (sér. 1) 17: 418, 1829; F.B.I. 3 : 297.

An erect, branched, rigid herb. Leaves sessile, lanceolate or oblong-lanceolate; basal auricles rounded or hastate. Heads bright yellow, 7-18 mm. in diam., heterogamous. Involucral bracts erect. Pappus of ray florets absent; of disc florets few, slender hairs.

Common on dry soil of fields and unused ground.

Flowers and Fruits : Oct.-March

J. K. Maheshwari 497, Najafgarh; 599, Ozirabad, Jamuna Banks

14. *Pulicaria* Gaertn.

P. crispa Sch.-Bip. in Webb & Berth. Phyt. Canar. 2 : 223, 1836-1847; F.B.I. 3 : 299; FUGP. 1 : 466.

A stout, diffuse, white-woolly herb. Leaves ascending, half-amplexicaul, linear-oblong or spatulate, undulate-crisped. Heads yellow, heterogamous, rayed. Achenes glabrous, oblong. Pappus much longer than the fruit.

Common in waste places and along Jamuna Banks in moist or dry, silty soils.

Local name : Haldwa

Flowers and Fruits : Feb.-Aug.

J. K. Maheshwari 914, Najafgarh

P. angustifolia DC. Prodr. 5 : 479, 1834; F.B.I. 3 : 299; FUGP. 1 : 465.

A rare plant. Recorded from the Jamuna Ravines near Delhi and Agra in Duthie's FUGP. (loc. cit). I have not seen the plant anywhere.

A very variable herb. Leaves sessile, linear-oblong or obovate. Ray florets ligulate, yellow. Achenes glabrate.

15. *Gnaphalium* Linn.

Polymorphic herbs; heads pale yellow, clustered or in leafy spikes.

Prostrate or ascending, white-woolly herbs; heads golden-yellow, in corymbose, leafless clusters. *G. indicum*
G. luteo-album subsp. *affine*

G. indicum Linn. Sp. Pl. 852, 1753; FBI. 3 : 289; FUGP. 1 : 461.

An erect or bent, white-woolly, polymorphic herb. Leaves linear-obovate or spatulate. Heads pale brown, in simple or branched, leafy spikes or ovoid clusters. Achenes ovoid, minutely papillose.

A common weed during the winter months in fields and moist, waste places. A form of this species often associated with *G. luteo-album* subsp. *affine* Koster, occurs along Jamuna Banks in moist, sandy soils. It is much slender than the form found in other parts.

Local name : Buchbucha

Flowers and Fruits : Dec.-April

J. K. Maheshwari 594, University Campus ; 1009

G. luteo-album Linn. subsp. *affine* (D. Don) Koster in Blumea 4 : 484, 1941.

G. affine D. Don. Prodr. Fl. Nepal. 173, 1825.

G. luteo-album var. *multiceps* Hook. f. in FBI. 3 : 288, 1881.

A prostrate or ascending, white-woolly herb. Leaves 2.5-5 × 0.75 cm., oblong or subspathulate, half-amplexicaul. Heads golden-yellow, leafless, in dense, corymbose, shining clusters, heterogamous. Achenes brown, oblong, papillose.

Common along the banks of the Jamuna on silty, moist or dry soils as well as near temporary ponds ; often associated with other winter ephemerals.

Flowers and Fruits : Feb.-April

J. K. Maheshwari 910, banks of Jamuna River

16. *Blumea* DC. nom. cons.

Heads all solitary :

Leaves dentate; pappus pink

Leaves serrate; pappus white

B. obliqua

B. bifoliata

Heads many :

Heads arranged in spiciform cymes or panicles :

Florets yellow; plants turpentine-smelling

Florets purple; plants not giving smell of turpentine

B. lacera

B. mollis

Heads arranged in broad, open or congested corymbs; florets yellow

B. laciniata

B. obliqua (Linn.) Druce in Rep. Bot. Exch. Club Brit. Isles 4 : 609, 1917.
Erigeron obliquus Linn. Mant. 573, 1771.

Blumea amplexans DC. in Wt. Contrib. 13, 1834 ; FBI. 3 : 260 ;
 FUGP. 1 : 451.

A decumbent, woody, deep-rooted herb. Branches densely villous.
 Leaves sessile, half-amplexicaul, oblong or obovate, dentate or the upper
 ones often entire. Heads disciform. Ray florets pinkish. Disc florets
 yellowish. Achenes hairy, oblong.

Common in dry, waste places and fallow grounds.

Flowers and Fruits : Feb.-May

J. K. Maheshwari 922, Timarpur

B. obliqua Druce var. *pubiflora* (DC.) Mahesh. in JBNHS. 54 : 805, 1957.
B. pubiflora DC. Prodr. 5 : 434, 1834.

B. amplexans DC. var. *pubiflora* (DC.) Cl. in FBI. 3 : 260, 1881.

This variety occurs in sandy soils near Okhla. A stout, villous herb.
 Young leaves densely villous. Florets pink. Heads larger than in the
 type.

Flowers and Fruits : March

J. K. Maheshwari 1047

B. bifoliata DC. in Wt. Contrib. 14, 1834 ; FBI. 3 : 261 ; FUGP. 1 : 452.

An erect, bushy, hairy herb, branching from base. Leaves serrate.
 Heads solitary, on long peduncles. Florets yellow. Achenes narrowly
 oblong, angular. Pappus white.

Occurs in waste places and fallow fields.

Flowers and Fruits : March-May

B. lacera (Burm. f.) DC. Prodr. 5 : 436, 1834 ; FBI. 3 : 263 ; FUGP.
 1 : 453 ; Merr. Enum. 3 : 602.

Conyza lacera Burm. f. Fl. Ind. 180, 1768.

An erect, leafy herb. Leaves oval or obovate, dentate or serrate,
 not lobed. Heads in short, axillary cymes or terminal, spiciform panicles.
 Florets yellow. Achenes not ribbed, glabrate.

Occurs in shady places and along canal banks; gives a strong smell
 of turpentine.

Flowers and Fruits : Feb.-June

B. mollis (D. Don) Merr. in Philip. Jour. Sci. (Bot.) 5 : 395, 1910.

Erigeron molle D. Don. Prodr. Fl. Nepal. 172, 1825.

Blumea wightiana DC. in Wt. Contrib. 14, 1834 ; FBI. 3 : 261 ; FUGP.
 1 : 453.

An erect, villous, leafy herb. Leaves ovate, obovate or lanceolate,
 serrate. Heads many, in spiciform cymes or panicles. Flowers pur-
 plish. Achenes terete or angular, sparsely hairy.

Common in fallow fields and unused ground.

Flowers and Fruits : Feb.-May

B. laciniata (Roxb.) DC. Prodr. 5: 436, 1834; FBI. 3: 264; FUGP. 1: 454.
Conyza laciniata Roxb. Hort. Beng. 61, 1814, nom. nud. & Fl. Ind.
 3: 427, 1832.

A tall, erect, hairy herb, 0.6-1.5 m. tall, corymbosely branched above. Lower leaves usually large; upper ones runcinate-lyrate or pinnatifid. Heads many, in open corymbs or panicles. Florets yellow. Achenes ribbed, silky.

Found in waste places, unused ground and near small water channels of gardens.

Flowers and Fruits : March-May

17. *Laggera* Sch.-Bip.

L. aurita Sch.-Bip. ex Cl. Comp. Ind. 92, 1876; FBI. 3: 271; FUGP. 1: 457.

A perennial, villous, branched herb. Leaves sessile, shortly decurrent, dentate or subpinnatifid. Heads pink, about 1×1 cm., in terminal, paniculate corymbs. Involucral bracts linear. Achenes hairy.

Common during the summer season in waste places, along roadsides, etc. becoming gregarious in some places.

Flowers and Fruits : June-July

J. K. Maheshwari 480, University Grounds

18. *Pluchea* Cass.

P. lanceolata Cl. Comp. Ind. 94, 1876; FBI. 3: 272; FUGP. 1: 458; Parker, For. Fl. 288.

An erect, stout, hoary-pubescent, robust herb, 30-100 cm. tall. Leaves thick, coriaceous, ascending, $4-7 \times 1-1.5$ cm., oblong or oblanceolate. Heads pinkish or purplish, 8×4 mm., in compound corymbs, longer than broad. Involucre many-seriate; outer bracts tinged with purple. Achenes minute.

A xerophytic plant. Common in sandy soils and often found on the slopes in gregarious patches. Very common near the village Gangatoli on Western Jamuna Canal. Eaten as fodder by the cattle.

Local name : Rukhri ; Bai surai

Flowers and Fruits : April-July

J. K. Maheshwari 162, Azadpur Road

19. *Xanthium* Linn.

X. strumarium Linn. Sp. Pl. 987, 1753; FBI. 3: 303; FUGP. 1: 467.

A scabrous, erect herb or undershrub, up to 1.5 m. tall. Leaves triangular-cordate, irregularly toothed. Heads bisexual and female (the latter 2-flowered) in racemes. Fruiting involucre clothed with hooked prickles.

Common in waste places, along roadsides and near habitations; often gregarious. Occurs on the Ridge in disturbed places. Also found in low-lying areas.

Local name: Bhangra ; Bichhu ; Churchuta ; Kutia ; Kutta ; Chit-chitta ; Bhurat ; Bhurchitta

Flowers and Fruits : Sept.-June

J. K. Maheshwari 113, Azadpur Road

20. *Glossocardia* Cass.

G. bosvallea (Linn. f.) DC. in Wt. Contrib. 19, 1834; Gamble, Fl. Pres. Mad. 709.

Verbesina bosvallea Linn. f. Suppl. 379, 1781.

Glossocardia linearifolia Cass. in Diet. Sc. Nat. 19 : 62, 1821, FBI. 3 : 308 ; FUGP. 1 : 471.

A small, prostrate or diffuse, tufted annual. Leaves bipinnatisect; segments narrowly linear. Heads small, yellow, heterogamous, about 8 × 8 mm. Achenes densely bearded, especially along the edges. Awns spreading.

Occurs in sandy and rocky tracts near Okhla and Faridabad.

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 734, Okhla ; 1237, Gurukul, near Gurgaon

21. *Eclipta* Linn. nom. cons.

E. prostrata (Linn.) Linn. Mant. 286, 1771 ; Santapau, Fl. Purandhar 68.

Verbesina prostrata Linn. Sp. Pl. 902, 1753.

Eclipta erecta Linn. Mant. 286, 1771 ; FUGP. 1 : 468.

E. alba Hassk. Pl. Jav. Rar. 528, 1848 ; FBI. 3 : 304.

An erect or prostrate, rough annual. Leaves variable, 2.5-8 × 0.8-1.5 cm., linear or oblong-lanceolate, turning black when dry. Heads white, 7 × 9 mm., solitary or 2-3 together. Achenes winged on the margin, with warty excrescences. Pappus absent.

Common in different types of habitats.

Flowers and Fruits : Throughout the year

J. K. Maheshwari 160, Shahdara

22. *Bidens* Linn.

B. biternata (Lour.) Merr. & Sherff in Bot. Gaz. 88 : 293, 1929 ; Santapau in RBSI. 16 (1) : 151, 1953.

Coreopsis bitermata Lour. Fl. Cochinch. 508, 1790.
Bidens pilosa auct. (non Linn.).

An erect herb, 30-100 cm. tall. Leaves variable, simple or compound, glabrous. Heads white or yellow, corymbosely paniced, heterogamous. Achenes 8-13 x 1 mm., quadrangular, ribbed, glabrous, black. Pappus 2-awned.

Common in moist, shady places of gardens and along the banks of small channels of Delhi Canal which passes through various parts of the district. It is troublesome at the time of fruiting when the ripe, awned achenes adhere to the clothes.

Local name : Chirchitta ; Sui ka ped

Flowers and Fruits : March-Nov.

J. K. Maheshwari 122, Roshanara Gardens ; 369, Old Delhi Ridge

23. *Blainvillea* Cass.

B. latifolia (Linn. f.) DC. in Wt. Contrib. 17, 1834 & Prodr. 5: 492, 1836.

Eclipta latifolia Linn. f. Suppl. 378, 1781.

Blainvillea rhomboidea Cass. in Dict. Sc. Nat. 29 : 493, 1823 ; FBL 3 : 305 ; FUGP. 1 : 469.

An erect, dichotomously branched, scabrous-hairy, robust herb or undershrub. Leaves crenate-serrate ; base cuneate. Florets white, heterogamous. Ray florets ligulate. Achenes triquetrous, curved. Disc florets tubular. Achenes nearly straight.

Found on the Ridge as well as in other parts near moist places or in the shades of shrubs and hedges. The fresh roots possess a faintly aromatic odour. Duthie in FUGP. (loc. cit.) gives winter as the flowering period. At Delhi it flowers and fruits during the rainy season.

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 920, Hauz Khas

24. *Viguiera* H. B. & K.

V. helianthoides H. B. & K. Nov. Gen. & Sp. 4 : 226, t. 379, 1820.

A cultivated shrub. Leaves scabrous, turning blackish on drying. Flowers yellow, like single sunflowers, borne in corymbs. Ray florets fertile or more often sterile. Achenes usually pubescent.

Grown in gardens and hedges.

Flowers and Fruits : March-July

J. K. Maheshwari 747

25. *Helianthus* Linn.

H. tuberosus Linn. Sp. Pl. 905, 1753 ; Bailey, Man. Cult. Pl. 998.

An erect, tuberous shrub. Leaves ovate to ovate-oblong, serrate-dentate; petioles winged. Heads yellow.

Cultivated for its edible tubers which are produced on the ends and branches of underground parts. Available in the market during November.

Local name : Hatipitch ; English name : Jerusalem artichoke

26. *Tridax* Linn.

T. procumbens Linn. Sp. Pl. 900, 1753 ; FBI. 3 : 311 ; FUGP. 1 : 475.

An erect or straggling, hispid herb. Leaves ovate or lanceolate, dentate or pinnatisect. Heads creamy or whitish, long-peduncled, about 1 × 1.5 cm. Achenes brown.

Abundant all over in waste places, along roadsides and in the crevices of old walls.

Flowers and Fruits : Dec.-May

J. K. Maheshwari 157 ; 915, University Campus

27. *Verbesina* Linn.

Leaves white-woolly beneath

Leaves not white-woolly beneath *V. encelioides*

V. oncophora

V. encelioides (Cav.) Benth. & Hook. f. ex A. Gray in Bot. Calif. 1 : 350, 1880.

Ximenesia encelioides Cav. Ic. 2 : 60, t. 178, 1793.

An erect, woolly, attractive perennial. Leaves distantly serrate or pinnatifidly lobed, 8-15 × 1.5-3 cm., white-woolly beneath, appressed hairy above. Heads golden-yellow, solitary, heterogamous, long-peduncled.

Native of Trop. America. Occurs along the canal banks of Hindan River, often gregarious amongst grasses.

Flowers : Aug.-Oct.

J. K. Maheshwari 1260 ; 1368

V. oncophora Robins. & Seat. in Proc. Amer. Acad. 28 : 109, 1893.

A shrub, 2-4 m. high. Leaves alternate, elliptic-oblong to oblong-ovate, serrulate. Heads numerous, cymosely paniculate.

Cultivated in the hedges of gardens as an ornamental shrub. Another species *V. gigantea* Jacq. is also grown in similar places.

Flowers and Fruits : Dec.-March

J. K. Maheshwari 1198

28. *Cotula* Linn.

C. hemisphaerica (Roxb.) Wall. ex Benth. & Hook. f. Gen. Pl. 2 : 429, 1873 ; FBI. 3 : 316 ; FUGP. 1 : 476.

Artemisia hemisphaerica Roxb. Fl. Ind. 3 : 422, 1832.

A small, erect or diffuse annual. Leaves pinnatisect ; segments linear. Heads yellow, disciform, heterogamous, solitary, about 4×6 mm. Achenes angled.

A winter season, moisture-loving herb. Common in cool, shady places.

Flowers and Fruits : Dec.-March
J. K. Maheshwari 917, Shahdara

29. *Artemisia* Linn.

A. scoparia Waldst. & Kit. Pl. Rar. Hung. 1 : 66, t. 65, 1802 ; FBI. 3 : 323 ; FUGP. 1 : 477.

An erect, branched, perennial herb, 1-1.8 m. tall. Stems usually tinged with purple. Leaves cut into filiform segments. Heads minute, 2×2 mm., heterogamous, greenish-yellow, arranged in a panicle. Involucral bracts shining. Achenes minute.

Common as a weed near Najafgarh village in the fields of rainy season crops, in waste places and along the 'bunds' of fields on damp, sandy soil. It is eaten by the cattle. The twigs are made into brooms for cleaning houses. Used as purgative.

Local name : Bano ; Barna

Flowers and Fruits : Sept.-Oct.

J. K. Maheshwari 1280 ; 1321, Najafgarh

30. *Echinops* Linn.

E. echinatus Roxb. Hort. Beng. 62, 1814, nom. nud. & Fl. Ind. 3 : 447, 1832 ; FBI. 3 : 358 ; FUGP. 1 : 480.

An erect or diffuse, much-branched, white-woolly annual. Leaves oblong, pinnatifid ; the lobes ending in long, rigid, narrow spines. Heads uniflowered, in compact, globose capitula. One or two bracts produced into sharp spines, exceeding the compound heads. Flowers pale blue. Achenes obconic, silky.

Common in waste, dry places and open ground.

Local name : Oontkatela

Flowers : Jan.-June. Fruits : June

J. K. Maheshwari 71, Najafgarh

31. *Carthamus* Linn.

Heads yellow ; plants wild

Heads orange-yellow ; plants cultivated

C. oxyacantha

C. tinctorius

C. oxyacantha Bieb. Fl. Taur. Cauc. 2 : 283, 1808 ; FBI. 3 : 386.

A spiny, pernicious weed. Stems and branches white. Leaves rigid ; margins spinose. Heads yellow, homogamous, about 2.5×2 cm. Bracts multiseriate. Achenes smooth, compressed, polished.

An introduced, obnoxious, hardy weed found amongst summer season crops. Occurs rather abundantly in fallow fields, waste ground and along roadsides where the site assumes a characteristic yellow appearance. It is believed that the seeds were brought to Uttar Pradesh a few years ago by the *Pili Aandhi* (yellow dust-storm). The weed exhausts the soils. The seeds germinate as the atmosphere warms up in April and May.

Local name : Kateri ; Kateli ; Pohli ; Kasumbhi
Flowers and Fruits : May-June

J. K. Maheshwari 676, Najafgarh fallow fields

C. tinctorius Linn. Sp. Pl. 830, 1753 ; FBI. 3 : 386 ; Merr. Enum. 3 : 620.
A glabrous shrub. Leaves spinose-toothed. Heads terminal, orange-yellow. Achenes white, shining.

Cultivated for its flowers which are used as a dye for clothes ; the achenes give an oil.

Local name : Kusum

Flowers and Fruits : March-May

J. K. Maheshwari 1167, University Gardens

32. *Cirsium* Adans.

C. arvense (Linn.) Scop. Fl. Carn. 2 : 126, 1772.

Serratula arvensis Linn. Sp. Pl. 820, 1753.

Cnicus arvensis Hoffm. Deutschl. Fl. 1(2) : 130, 1804 ; FBI. 3 : 362 ; FUGP. 1 : 481.

An erect, leafy herb, 0.6-1 m. tall. Leaves oblong-linear or obovate, woolly beneath ; margins tipped with spines. Flowers deep pink to pale purple. Achenes small. Pappus pale brown.

Common in waste places, cultivated areas and along field edges.

Local name : Kateli ; Katala ; Rissa

Flowers and Fruits : Feb.-April

J. K. Maheshwari 613, Uzirpur (Azadpur)

C. wallichii DC. Prodr. 6 : 643, 1837.

Cnicus wallichii Hook. f. in FBI. 3 : 363, 1881 ; FUGP. 1 : 481.

Very rare. [see Mukherjee in JBNHS. 51(2) : 452, 1953]. Differs from *C. arvense* Scop. in being taller (1.2-3 m.) and in possessing bisexual, yellow flowers.

Flowers : Feb.-March

33. *Cynara* Linn.

C. scolymus Linn. Sp. Pl. 827, 1753 ; Bailey, Man. Cult. Pl. 1029.

A tall thistle. Leaves pinnatifid, hardly spiny. Heads large. Receptacle enlarged, fleshy. Involucral bracts unarmed.

Cultivated as garden vegetable for its soft, fleshy receptacle of flower heads and thickened bases of involucral bracts. Available during the months of March and April. Grown from seeds or suckers.

Local name : Hatichuk ; English name : Globe artichoke

34. *Voluntarella* Cass.

V. ramosa (Roxb.) Santapau, Pl. Saur. 22, 1953.

Carduus ramosus Roxb. Fl. Ind. 3 : 407, 1832.

Voluntarella divaricata Benth. & Hook. f. Gen. Pl. 2 : 476, 1873, in part ; FBI. 3 : 383 ; FUGP. 1 : 486.

An erect or straggling, stiff, dichotomously branched annual. Stems white-tomentose, rough. Leaves variable, obovate to oblanceolate, usually pinnatifid-lobed. Heads 1.2-2.5 × 0.8-1.5 cm., ovoid, homogamous. Involucral bracts many-seriate, spinescent at tip. Flowers purplish. Achenes dull brown. Pappus brown, silvery.

Common in dry, waste places ; comes up annually on the University Grounds. The young plants are used as fodder.

Local name : Rissa

Flowers and Fruits : March-Aug. ; Winter

J. K. Maheshwari 916, Chandrawal (near Timarpur)

35. *Dicoma* Cass.

D. tomentosa Cass. in Bull. Soc. Philom. 12, 1818 ; FBI. 3 : 387 ; FUGP. 1 : 487.

Duthie (in FUGP. 1 : 487) records this species from the Jamuna and Chambal Ravines in the districts of Agra, Delhi and Etawah. I have not seen the plant in the field.

An erect, much-branched herb. Stems white-woolly or finally glabrous. Leaves linear, densely white-tomentose. Heads many, solitary. Involucral bracts spinescent.

36. *Hymenatherum* Cass.

H. tenuifolium Cass. Dict. Sc. Nat. 22 : 314, 1821-1822 ; DC. Prodr. 5 : 642, 1834.

An annual, strong-smelling, erect herb, 15-20 cm. high. Stems simple or branched. Leaves deeply pinnatisect, 2.5 × 1-3 cm. ; lobes more or less filiform. Heads yellow, heterogamous, rayed, about 2 cm. in diam., terminal, showy. Involucres uniseriate. Achenes oblong, angled, black,

hispid-hairy; pappus of setose hairs about as long as the corolla tube.

Native of Central America. Grown as an annual, winter ornamental and as border plant in garden beds, but often spontaneous in waste places near gardens and bungalows.

Flowers and Fruits : Oct.-April

J. K. Maheshwari 911, Lodi Gardens

56. *Sphenocleaceae*

Sphenoclea Gaertn.

S. zeylanica Gaertn. Fruct. 1 : 113, t. 24, 1788 ; FBI. 3 : 438 ; FUGP. 1 : 499 ; Merr. Enum. 3 : 588.

A stout, amphibious herb, 30-90 cm. tall. Stems fistular. Leaves 5-7.5 x 0.7-1 cm. Spikes erect, cylindric. Flowers greenish-yellow. Petals white. Capsules 5 x 4 mm., wedge-shaped, enclosed by the persistent calyx. Dehiscence circumscissile. Seeds minute, brown.

Rare. Found in swampy areas along the banks of canals. Occurs in the marshes of Najafgarh Drain on mud or submerged under water.

Local name : Mirchi ; Phulanghas

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 436

57. *Plumbaginaceae*

Plumbago Linn.

P. zeylanica Linn. Sp. Pl. 151, 1753 ; FBI. 3 : 480 ; FUGP. 2 : 2 ; Parker. For. Fl. 300 ; Merr. Enum. 3 : 275 ; Bor & Raiz. 162, f. 102.

A straggling or spreading shrub. Stems striate. Leaves thin, ovate, entire, 5-10 x 2.5-6 cm. Flowers white, in long, spiciform racemes. Calyx sticky, densely glandular, persistent. Capsules oblong.

Naturalized on the Ridge and adjacent hilly tracts, straggling amongst bushes of *Capparis sepiaria* Linn. Also found in waste places near gardens.

Local name : Chatawar ; Chirchitta ; Makkhi

Flowers and Fruits : Sept.-Feb.

J. K. Maheshwari 511, Ridge ; 839, near Qutab

58. *Primulaceae*

Anagallis Linn.

A. arvensis Linn. Sp. Pl. 148, 1753 ; FBI. 3 : 506 ; FUGP. 2 : 6.

An erect or procumbent, glabrous annual. Branches quadrangular, flattish or winged. Leaves up to 2.5×1.6 cm., cordate, entire. Flowers bright blue, solitary; pedicels decurved in fruits. Stamens 5. Capsules many-seeded, circumsciss, about 5×5 mm.

A moisture-loving plant; common as a winter season weed in fields and waste places, often associated with *Veronica agrestis* Linn., *Stellaria media* Vill., *Spergula arvensis* Linn., and *Malva parviflora* Linn. The flowers close in dull weather.

Local name : Dharati-dhak ; Buchbucha

Flowers and Fruits : Dec.-April

J. K. Maheshwari 598

59. Sapotaceae

Calyx lobes 4-5 ; staminodes none *Madhuca*

Calyx lobes 6-8 ; staminodes present :

Petals 18-24 ; berries up to 1.5 cm. across, yellow or reddish-yellow when ripe :

Flowers normally tetramerous *Mimusops*

Flowers normally trimerous *Manilkara*

Petals 6; berries 4.5-5 cm. across, with thin, rusty-brown, scurfy skin *Achras*

Madhuca J. F. Gmel.

M. indica J. F. Gmel. Syst. Nat. 2 : 799, 1791 ; Santapau in RBSI. 16(1) : 160, 1953.

Bassia latifolia Roxb. Pl. Cor. 1 : 20, t. 19, 1795 ; FBI. 3 : 544 ; FUGP. 2 : 11.

Madhuca latifolia (Roxb.) Macbride in Contr. Gray Herb. (n.s.) 53 : 18, 1918.

A large or medium-sized, deciduous tree. Bark dull black. Leaves clustered at the ends of branches, $15-25 \times 9-12$ cm., elliptic, obovate or broadly lanceolate, prominently nerved beneath. Flowers cream-coloured, peculiarly musty, sweet-scented, drooping, rusty-tomentose, in dense fascicles at the ends of leafless branches.

Planted along the roadsides and side-lanes of New Delhi. Also found in the fruit orchards. The fragrant, fleshy petals are eaten either raw or cooked, or made into sweet preparations.

Local name : Mahua ; Mohwa

Flowers : March-April

J. K. Maheshwari 1382, Gulab Bagh

Mimusops Linn.

M. elengi Linn. Sp. Pl. 349, 1753; FBI. 3 : 548; FUGP. 2 : 13; Merr. Enum. 3 : 288.

A medium-sized, evergreen, handsome tree. Bark dark grey. Leaves variable, oblong, oblanceolate, elliptic or elliptic-obovate, 6-13 x 3-5.5 cm., coriaceous. Flowers dirty white, about 1 x 1.5 cm., star-shaped, solitary or clustered. Berries yellow when ripe.

Commonly planted in public and private gardens. The small, fragrant flowers are much esteemed by the local people. They are collected after they have fallen on the ground and are made into garlands. The ripe fruits are edible but are of poor quality and sometimes collected by children.

Local name : Maulsari

Flowers : March-July. Fruits : Jan.-Feb.

J. K. Maheshwari 226, garden on Azadpur Road

Manilkara Adans.

M. hexandra (Roxb.) Dub. in Ann. Mus. Col. Marseille (sér. 3) 3 : 9, 1915; Bor. Man. Ind. For. Bot. 235.

Mimusops hexandra Roxb. Pl. Cor. 1 : 16, t. 15, 1795 & Fl. Ind. 1 : 238; FBI. 3 : 549; FUGP. 2 : 13.

A small or medium-sized, evergreen tree, forming a dense crown. Bark greyish-black or grey-white. Leaves 5-10 x 3.5-5 cm., obovate, oblong or elliptic, rounded or emarginate at tip, shining above. Flowers solitary or fascicled. Berries ovoid, 1-seeded, about 1.5 x 1 cm.

Cultivated in gardens and fruit orchards for its edible fruits which are available in the market during summer. Common in the Mehrauli Gardens near Qutab.

Local name : Khirni

Flowers : Oct.-Dec. Fruits : Jan.-Feb.

J. K. Maheshwari 578, Qudsia Gardens ; 833, near Qutab ; 909, Rashtrapati Bhavan Campus

Achras Linn.

A. zapota Linn. Sp. Pl. 1190, 1753; Bailey, Man. Cult. Pl. 790; Bor. Man. Ind. For. Bot. 233.

An evergreen, handsome tree. Leaves oblong-lanceolate or elliptic-oblong, 7.5-12.5 x 3-5.5 cm., crowded at ends of branchlets. Flowers white, long-pedicelled. Fruits globose, with thin, rusty-brown epicarp; flesh yellowish-brown. Seeds large, shining, black.

Cultivated in the Sarai Rohilla and Sabzimandi Gardens for its very palatable, sweet fruits which are sold in the market.

Local name : Cheeku
 Fruits : Feb.-March
 J. K. Maheshwari 1369, No. 2 Chowki Gardens (Sabzimandi)

60. Ebenaceae

Diospyros Linn.

Leaves glabrous ; fruits covered with a dense, rusty scurf *D. peregrina*

Leaves glabrescent ; fruits glabrous : *D. cordifolia*

Leaves 4-6 cm. long ; male flowers in threes *D. cordifolia*

Leaves 6-10 cm. long ; male flowers in small, few-flowered panicles *D. montana*

D. peregrina (Gaertn.) Gürke in Engl. & Prantl, Nat. Pfam. 4(1): 164, 1891 ; Benthall. Trees Calc. 294.

Embryopteris peregrina Gaertn. Fruct. 1 : 145, t. 29, f. 2, 1788.

Diospyros embryopteris Pers. Syn. 2 : 624, 1807.

A small, evergreen tree forming a compact, shady crown near the ground. Young foliage reddish. Leaves 12-23 × 4-6 cm., ovate-oblong to oblong, coriaceous. Flowers unisexual, cream-coloured. Female flowers solitary, drooping. Calyx accrescent. Fruits 3-5 cm. across, almost globose, rust-coloured, yellow when ripe.

Introduced. A few trees have been planted in the campus of Rashtrapati Bhavan.

Local name : Kumbh

Flowers and Fruits : May-July

J. K. Maheshwari 685, Rashtrapati Bhavan Campus

D. cordifolia Roxb. Pl. Cor. 1 : 38, t. 50, 1795 & Fl. Ind. 2: 538, 1832; FUGP. 2 : 17.

D. montana Cl. in FBI, 3: 555, 1882, in part.

A large shrub or small tree. Leaves ovate-oblong to ovate-lanceolate, cordate or rounded at base, subacuminate. Male flowers pale white, in triads on axillary cymes. Calyx persistent, enlarged in fruits; lobes reflexed. Fruits globose, yellow at maturity.

Probably planted, since it is commonly met in the hedges of fruit orchards, often along with *Capparis sepiaria* Linn., and *Kirganelia reticulata* Baill. Grows well on moist, sandy and clayey soils near canal banks. A few trees also occur on the New Delhi Ridge. The wood is used as fuel. The fruits are used in medicine.

Local name : Kendu

Flowers : Summer season. Fruits : Rainy season

J. K. Maheshwari 1004, New Delhi Ridge

D. montana Roxb. Pl. Cor. 1 : 37, t. 48, 1795 & Fl. Ind. 2 : 538, 1832;
FUGP. 2 : 15; Merr. Enum. 3 : 293.

A shrub or small tree. Leaves ovate-oblong, subacuminate. Male flowers pale yellow, in small, few-flowered panicles. Calyx of female flowers persistent, enlarged in fruits, reflexed. Fruits pendulous, globose, about 2.5 cm. across.

Probably planted, since it is commonly found in the hedges of fruit orchards, where it makes a nice fence along with *Capparis sepiaria* Linn., and *Kirganella reticulata* Baill. Grows well on moist, clayey soils near canal banks.

Local name : Basendu ; Kendu
Flowers : Summer season

61. Oleaceae

Erect, scandent or climbing shrubs, with simple or compound leaves ; flowers in terminal or axillary cymes
Trees with simple leaves ; flowers in axillary, condensed panicles or fascicles

Jasminum Linn.

Flowers yellow

Flowers white :

Leaves unifoliolate :

Plants hairy ; calyx lobes short

Plants very hairy ; calyx lobes very long

Leaves 3- or more foliolate :

Leaves with the two lower leaflets very small and frequently absent

Leaves distinctly compound :

Terminal leaflet much larger than others ; laterals acute

Terminal leaflet scarcely larger than the other ; laterals usually very obtuse

J. humile Linn. Sp. Pl. 7, 1753 ; Bailey, Man. Cult. Pl. 798 ; Bor & Raiz. 221, f. 131, Pl. 80.

An erect or diffuse, evergreen shrub. Leaflets 3-7, variable in shape, ovate to linear, dark green above. Flowers bright yellow, fragrant, in open clusters.

Grown as an ornamental in gardens and areas around bungalows for its fragrant blossoms.

Local name : Pili chameli

Flowers : Rainy season

J. K. Maheshwari 713

J. sambac (Linn.) Ait. Hort. Kew. 1 : 8, 1789 ; Bailey, Man. Cult. Pl. 798 ; Bor & Raiz. 218, f. 128.

Nyctanthes sambac Linn. Sp. Pl. 6, 1753.

A erect or subscandent, bushy shrub. Leaves elliptic or broadly ovate, glabrous, shining. Flowers white, pinkish-violet in bud, usually double, fragrant, in few to many-flowered clusters.

Grown in gardens for its exquisitely fragrant flowers that fall off without seed setting.

Local name : Bela ; Chamela ; Mogra

Flowers : Summer season

J. K. Maheshwari 1023, Azadpur Gardens

J. multiflorum (Burm. f.) Andr. Bot. Rep. 8, t. 496, 1807 ; Merr. Enum. 3 : 307.

Nyctanthes multiflora Burm. f. Fl. Ind. 5, t. 3, f. 1, 1768.

Jasminum pubescens Willd. Sp. Pl. 1 : 37, 1797 ; FBI, 3 : 592 ; Bor & Raiz. 219, f. 129, Pl. 78.

A scandent or diffuse, densely pubescent shrub. Leaves simple, ovate, thick, cordate. Flowers white, slightly scented, in terminal, many-flowered umbels. Calyx teeth 1 cm. or more in length.

Grown commonly in gardens, lawns and hedges, for its densely profused umbels of flowers. It is moderately hardy and gives a beautiful appearance to the landscape.

Local name : Safed chameli ; Bela

Flowers : Cold season

J. K. Maheshwari 128 ; 538, University Campus

J. auriculatum Vahl, Symb. Bot. 3 : 1, 1794 ; FBI, 3 : 600.

A bushy or climbing shrub. Leaves with a pair of minute leaflets or simple. Flowers white, star-shaped.

Grown for its fragrant flowers.

Local name : Joohi

Flowers : Rainy season

J. K. Maheshwari 1443

J. officinale Linn. Sp. Pl. 7, 1753 ; Parker, For. Fl. 316 ; Bailey, Man. Cult. Pl. 798 ; Bor & Raiz. 222, f. 132.

A diffuse or climbing shrub, requiring support. Leaflets 5-7, elliptic, ovate or rhomboid-oblong. Flowers white, fragrant, in terminal clusters.

Native of Persia and Kashmir. Grown for its pretty leaves and fragrant flowers.

Local name : Motia

Flowers : Nov.-Dec.

J. K. Maheshwari 1212, University Campus

J. grandiflorum Linn. Sp. Pl. 9, 1762; Merr. Enum. 3: 307; Parker, For. Fl. 317; Bor & Raiz. 223, f. 133, Pl. 81.
A pretty shrub. Branches drooping. Rachis flattened or winged. Leaflets 5-7, elliptic or oval, cuspidate. Flowers white, star-shaped, fragrant.
Cultivated.

Local name : Chameli

Flowers : Summer and rainy seasons

Olea Linn.

O. europaea Linn. Sp. Pl. 8, 1753; Bailey, Man. Cult. Pl. 795.

An erect, small tree, rather weak, branching from base. Bark dull black. Leaves 6-9 × 2.5-3.5 cm., elliptic, ovate, oblong or lanceolate, tapering at ends, rusty-yellow or coppery beneath, coriaceous. Flowers white, in axillary, condensed panicles or fascicles. Drupes ovoid.

Rare. A few trees have been planted in the campus of Rashtrapati Bhavan and Rajghat, where they flower and fruit annually.

Flowers : March-April. Fruits : May-June

J. K. Maheshwari 695; 937

62. Salvadoraceae

Salvadora Linn.

Leaves ovate to ovate-lanceolate; flowers pedicellate; ripe fruits red

Leaves linear-lanceolate; flowers sessile; ripe fruits yellow . *S. persica*
S. oleoides

S. persica Linn. Sp. Pl. 122, 1753; FBI. 3: 619; FUGP. 2: 28; Parker, For. Fl. 323.

A small or medium-sized tree, crooked or bent. Bark dull grey or grey-white. Trunk deeply grooved, attaining a girth up to 1 m. Branchlets hanging. Leaves variable in shape, ovate, elliptic-ovate or ovate-lanceolate, 2.5-6.5 × 2-4 cm., pale green, glossy, fleshy. Flowers greenish-yellow, in axillary and terminal panicles. Drupes globose, 3 × 3 mm., fleshy, dark red at maturity.

Occurs on the Ridge, becoming common at places. It has become gregarious forming compact clumps in some areas along the uplands near Jamuna Banks in Old Delhi. Also planted. The crushed leaves emit a sweetish odour. The wood is used as fuel.

Local name : Pilu; Khanjar

Flowers : Jan.-April. Fruits : July

J. K. Maheshwari 1286, Ridge

S. oleoides Decne. in Jacq. Voy. Bot. 140, t. 144, 1844; FBL. 3: 620; FUGP. 2: 29; Parker, For. Fl. 324.

An evergreen shrub or small tree. Bark grey. Young foliage ovate. Mature leaves linear-lanceolate, up to 9×2 cm., dull green, coriaceous. Flowers greenish-white, in panicle spikes. Drupes globose, yellow when ripe.

Found on the Ridge as well as in neighbouring hilly tracts. Also grows as a liana on other trees of the Ridge. Common in the saline soils of Khadar area and between the Grand Trunk Road and Rohtak Road. The inflorescence is often attacked by a disease resulting in a proliferated, green, crumpled mass which finally turns black. The fruits are sweetish and are eaten.

Local name: Pilu; Jal

Flowers: March-May. Fruits: May-June

J. K. Maheshwari 1367, near Gurdwara (Jamuna Road)

63. Apocynaceae

Erect herbs or small shrubs:

Flowers solitary or paired; fruit a follicle, dehiscent . . . *Catharanthus*

Flowers in cymes; fruit a drupe, indehiscent . . . *Rauvolfia*

Erect, diffuse or climbing shrubs and trees:

Habit climbing:

Anthers exserted . . . *Vallisneria*

Anthers included:

Flowers as long as 10 cm. or more, bell-shaped . . . *Beaumontia*

Flowers not exceeding 2 cm., salverform:

Flowers in lax, terminal or pseudoaxillary cymes . . . *Trachelospermum*

Flowers in compact, trichotomous cymes . . . *Ichnocarpus*

Habit erect or diffuse:

Plants armed with spines . . . *Carissa*

Plants unarmed:

Leaves alternate:

Corolla funnel-shaped; fruit indehiscent, a fleshy drupe . . . *Thevetia*

Corolla salver-shaped; fruit of 2, dehiscent follicles . . . *Plumeria*

Leaves opposite or whorled; corolla salver-shaped:

Leaves whorled:

Trees; flowers greenish-yellow . . . *Alstonia*

Large shrubs; flowers white, rosy or red . . . *Nerium*

Leaves opposite ; flowers white, pink or red ;

Mouth of corolla without a corona of scales :

Shrubs ; foliicles few-seeded, baccate, stout, coriaceous *Tabernaemontana*

Trees ; foliicles many-seeded, linear *Holarrhena*

Mouth of corolla with a corona of scales *Wrightia*

Catharanthus G. Don

C. pusillus (Murr.) G. Don, Gen. Syst. 4: 95, 1836 ; Farnsworth in Lloydia 24 : 107, 1961.

Vinca pusilla Murr. in Comm. Gotting. 3 : 66, t. 2, f. 1, 1773.

Lochnera pusilla K. Schum. in Engl. & Prantl. Nat. Pfam. 4(2): 145, 1895 ; FUGP. 2 : 34.

An erect, much-branched, pale green, glabrous herb. Stems and branches 4-angular. Leaves lanceolate, $4.75 \times 1.5-2.2$ cm. Flowers white, solitary or paired. Corolla lobes unequal. Follicles linear, subtorulose, 4.5×0.2 cm. Seeds black, cylindric, muricately ribbed.

Common in and near fields of Jowar, Bajra and edible legumes and also in fallow fields on damp, sandy soil. The local peasants say that the herb makes animals mad and causes eruptions in the neck.

Local name : Teanklo

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 334

Rauvolfia Linn.

R. serpentina (Linn.) Benth. ex Kurz, For. Fl. Burma 2: 171, 1877; FBI. 3 : 632 ; FUGP. 2 : 33 ; Parker, For. Fl. 328; Santapau in RBSI. 16(1) : 166, 1953.

Ophioxylon serpentinum Linn. Sp. Pl. 1043, 1753.

An erect, small shrub, branching from base, up to 0.75 m. tall. Stems lenticellate, pale-coloured. Leaves elliptic-lanceolate or obovate to oblanceolate, pale beneath, in whorls of 3, $12-20 \times 4-6$ cm. Flowers pink or rosy, in terminal or lateral, long-peduncled cymes. Pedicels and calyces red. Corolla inflated near the middle. Drupes dark purple, about 0.8×0.8 cm., single or didymous.

Common in a semi-wild state in some of the Sabzimandi fruit orchards. The plant flowers and fruits annually and occurs as a shrubby undergrowth on moist or wet, sandy-clayey soils of gardens where *Eriobotrya japonica* Lindl., *Prunus persica* Stokes, *Psidium guajava* Linn., and *Achras zapota* Linn. are grown. It becomes less common in January and February when the ground is dominated mainly by *Ageratum conyzoides* Linn. The local people make no use of this plant except that the leaves are given as fodder.

Local name : Makalmarua
 Flowers and Fruits : Oct.-Jan.
 J. K. Maheshwari 1370, No. 2 Chowki Gardens (Sabzimandi)

Vallisneria Burm.

V. solanacea (Roth) Kuntze, Rev. Gen. 2: 417, 1891; Bor, Man. Ind. For. Bot. 284.

Peltanthera solanacea Roth, Nov. Pl. Sp. 132, 1821.

Vallisneria heynei Spreng. Syst. 1: 635, 1824; FBL 3: 650; FUGP. 2: 37; Bor & Raiz. 208, f. 123.

A twining, spreading or straggling shrub. Leaves ovate-oblong or elliptic, subacuminate. Flowers cream-coloured, fragrant, about 2.5 cm. across, in axillary, branched cymes. Corolla tube short, abruptly swollen above into a cup-shaped limb.

Grown for ornamental purposes. In the lawns of Qutab it was observed as a straggling shrub, climbing upon itself or on other creepers.

Flowers : March-Aug.

J. K. Maheshwari 641, Mughal Gardens

Beaumontia Wall.

B. grandiflora Wall. Tent. Fl. Nepal. 15, t. 7, 1824; FBL 3: 660; Santapau in RBSI, 16(1): 168, 1953; Bor & Raiz. 206.

A woody, evergreen, climbing shrub. Leaves 10-20 × 7-10 cm., elliptic to obovate, abruptly acuminate. Flowers large, white, in terminal cymes, subtended by foliar bracts.

Native of Himalayas. Cultivated as a creeper on walls around bungalows and in gardens for its fragrant, showy flowers.

Flowers : March-April

J. K. Maheshwari 640, Mughal Gardens

Trachelospermum Lem.

T. jasminoides Lem. Jard. Fleur. 1: t. 61, 1851; Bailey, Man. Cult. Pl. 811; Bor & Raiz. 213, f. 126.

An evergreen, climbing shrub. Leaves variable, 5-10 × 2.5-4 cm., elliptic, obovate to ovate-lanceolate, glossy above. Flowers white, in terminal or axillary, lax cymes. Follicles 2, terete.

Native of China. Cultivated as a creeper on walls or on the trellis in gardens for its jasmine-like, fragrant flowers.

Flowers : March-April. Fruits : Aug.-Oct.

J. K. Maheshwari 644, Mughal Gardens ; 705

Ichnocarpus R. Br. nom. cons.

I. frutescens (Linn.) Ait. & Ait. f. Hort. Kew, 2 : 69, 1811 ; FBI. 3 : 669 ; FUGP. 2 : 41 ; Parker, For. Fl. 333.

Apocynum frutescens Linn. Sp. Pl. 213, 1753.

An evergreen, extensively climbing, much-branched shrub. Young branches, inflorescences and petioles rusty-villous. Leaves variable, 5-7.5 x 4 cm., elliptic, oblong or ovate-lanceolate. Flowers greenish-white, somewhat fragrant, about 5 x 4 mm. Corolla twice as long as the calyx, tube swollen round the included anthers ; lobes twisted-acuminate.

Uncommon. Found as a climber in areas of moist, shady localities and dense vegetation ; collected from the hedges in Sabzimandi and Roshanara Gardens.

Flowers : Winter season

J. K. Maheshwari 865, Sarai Rohilla Gardens

Carissa Linn. nom. cons.

Leaves 1.5-4 cm. long ; berries up to 0.7 cm. across ; plants wild or planted *C. spinarum*

Leaves 3.5-8 cm. long ; berries up to 1.3 cm. across ; plants cultivated *C. carandus*

C. spinarum Linn. Mant. 559, 1771 ; FBI. 3 : 631 ; FUGP. 2 : 32 ; Parker, For. Fl. 327.

A bushy, diffuse, evergreen shrub (rarely a small tree) with rigid, spreading branches. Bark grey-white. Thorns 1.5-5 cm. long, straight, simple or forked, divaricate. Leaves smaller than those of *C. carandus* Linn., 1.5-4 x 1.2-2 cm., broad ovate, elliptic or suborbicular. Flowers pure white, scented, in terminal and axillary, corymbose cymes, fading towards reddish-brown. Berries dark purple at maturity, about 7 x 7 mm.

Found on the Ridge in dry, stony places, alone or associated with *Capparis sepiaria* Linn., which it resembles in a xerophytic appearance. It is readily distinguishable from the latter in the field by its long, straight thorns and fragrant, salver-shaped flowers. The flowers are attacked by an insect in which case the corolla tubes become reddish outside and somewhat inflated. Also planted in the hedges of fruit orchards. It scents the air with its delicate fragrance.

Local name : Kikraunda ; Jangli karaunda

Flowers and Fruits : July-Dec. ; March-April

J. K. Maheshwari 502, Ridge

C. carandus Linn. Mant. 52, 1767 ; FBI. 3 : 630 ; FUGP. 2 : 31.

A variable, evergreen, diffuse shrub, erect, suberect or scandent.

Leaves $3.5-8 \times 2.5-5.5$ cm., very variable in shape, broadly elliptic or oblong, rarely mucronate. Spines paired, straight. Flowers white or pinkish, in terminal, corymbose cymes. Corolla tube 1.2-2.3 cm. long. Berries ellipsoid, smooth, pretty, at first green, later purple.

Cultivated in gardens and fruit orchards for its fruits which are used for pickles, jams, chutneys and as vegetable. The fruits are sold in the market. The varieties having berries with red and pink cheeks are commonly grown in the area.

Local name : Karaunda

Flowers : April-June. Fruits : June-July

J. K. Maheshwari 232, Shahdara ; 866, Azadpur Gardens

Thevetia Linn. nom. cons.

T. peruviana (Pers.) Merr. in Philip. Jour. Sci. (Bot.) 9 : 130, 1914 & Enum. 3 : 331 ; Benthall, Trees Calc. 302.

Cerbera peruviana Pers. Syn. 1 : 267, 1805.

C. thevetia Linn. Sp. Pl. 209, 1753.

Thevetia nerifolia Juss. ex Steud. Nom. 2 : 680, 1841 ; Bor & Raiz, 193, f. 194.

An evergreen, leafy shrub or small tree. Leaves linear, $10-15 \times 0.8$ cm., revolute, dark green and polished above. Flowers yellow or orange, fragrant. Drupes angular.

Introduced. Native of Trop. America. Common in gardens and around houses as a fencing plant.

Local name : Peela kaner ; English name : Yellow oleander

Flowers : Most part of the year

J. K. Maheshwari 377

Plumeria Linn.

P. rubra Linn. Sp. Pl. 209, 1753 ; Bailey, Man. Cult. Pl. 810.

A small tree. Leaves obovate, up to 45×15 cm., prominently nerved beneath, marginal veins conspicuous. Flowers red, golden-yellow inside, very fragrant. Follicles 30×3.5 cm.

Planted in gardens.

Local name : Champa

Flowers : June-Sept.

P. rubra Linn. forma *acutifolia* (Poir.) Woodson in Ann. Miss. Bot. Gard. 25 : 211, 1938 ; Benthall, Trees Calc. 304 ; Blatt. & Mill. Beaut. Ind. Tr. 112, t. 24.

P. acutifolia Poir. in Lamk. Encycl. Suppl. 2 : 667, 1811 ; FBI. 3 : 641.

It differs from the above species in the possession of white or cream-coloured flowers, usually with a yellow centre.

Local name : Champa
 Flowers : June-Sept.
 J. K. Maheshwari 1146

Alstonia R. Br. nom. cons.

A. scholaris (Linn.) R. Br. in Mem. Wern. Soc. 1 : 75, 1810 ; FBI. 3 : 642 ;
 FUGP. 2 : 34 ; Merr. Enum. 3 : 322 ; Benthall, Trees Calc. 310.
Echites scholaris Linn. Mant. 55, 1767.

An erect, small or medium-sized, evergreen tree with a dense crown.
 Bark grey-white. Leaves 10-20 x 4.5-5.5 cm., oblong-lanceolate or
 obovate, bright green, glossy, thick, crowded at the ends of branches.
 Flowers greenish-yellow, in compact, umbellate cymes. Follicles terete,
 pendulous in clusters.

Planted in gardens and lawns. The latex of the plant is very sticky
 and is used as paste.

Flowers : Winter season. Fruits : March-June

J. K. Maheshwari 629, Jamia Millia, Okhla Road ; 1357, University
 Lawns

Nerium Linn.

N. indicum Mill. Gard. Dict. n. 2, 1768 ; Merr. Enum. 3 : 336 ; Santa-
 pau in RBSI. 16(1) : 170, 1953.

N. odorum Soland. in Ait. Hort. Kew. 1 : 297, 1789 ; FBI. 3 : 655 ;
 FUGP. 2 : 40 ; Bor & Raiz. 199, f. 198.

N. oleander Blanco, Fl. Filip. 104, 1837 ; 75, 1845 ; 1 : 140, t. 47,
 1877 (non Linn.).

A large, evergreen, garden shrub. Leaves ternate, linear-lanceolate,
 dark green above. Flowers white, rosy or red, fragrant, in terminal
 cymes.

Commonly cultivated in the hedges of gardens. It thrives vigorously
 in the area and perfumes the air with its delicate scent.

Local name : Kaner ; Chandni

Flowers : Summer season

J. K. Maheshwari 54

Tabernaemontana Linn.

T. divaricata (Linn.) R. Br. in Roem. & Schult. Syst. 4 : 427, 1819 ;
 Merr. in Contr. Arn. Arb. 8 : 140, 1934 ; Santapau in RBSI. 16(1) :
 167, 1953.

Nerium divaricatum Linn. Sp. Pl. 209, 1753 (quoad syn. Fl. Zeyl. excl.
 syn. Hermann).

Tabernaemontana coronaria Willd. Enum. Hort. Berol. 275, 1809 ;
 FBI. 3 : 646.

Ervatamia coronaria Stapf in This.-Dyer, Fl. Trop. Africa 4 : 127, 1902.

An evergreen shrub, 2.5 m. or more in tallness. Leaves $7-15 \times 3.5-5$ cm., oblong to lanceolate. Stipules cup-like. Flowers pure white, fragrant at night, in few-flowered cymes. Follicles $2.5-5 \times 1-1.5$ cm., with recurved beaks. Seeds embedded in a red, pulpy aril.

Introduced. Native of tropics. Commonly cultivated in gardens for its beautiful, glossy foliage and fragrant, ornamental flowers produced profusely during the rains.

Local name : Chamela ; Chandni

Flowers : May-Oct. Fruits : Winter

J. K. Maheshwari 98, Roshanara Gardens

Holarrhena R. Br.

H. antidysenterica (Linn.) Wall. Cat. 1672, 1829, nom. nud.; G. Don, Gen. Syst. 4 : 78, 1837; FBI. 3 : 644; FUGP. 2 : 35; Parker, For. Fl. 329; Santapau in RBSI. 16(1) : 167, 1953.

Nerium antidysentericum Linn. Sp. Pl. 209, 1753.

A small, deciduous tree, 3-5 m. tall. Leaves opposite, broad ovate or elliptic. Flowers white, in terminal cymes. Follicles 2, very narrow, $20-40 \times 0.6-0.8$ cm. Seeds with a tuft of hair.

Occurs on the Ridge. Easily confused with *Wrightia tinctoria* R. Br., from which it is distinguished by absence of corona and included anthers.

Local name : Kurchi

Flowers : May-June

Wrightia R.Br.

W. tinctoria R. Br. in Mem. Wern. Soc. 1 : 73, 1810 ; FBI. 3 : 653; FUGP. 2 : 38; Parker, For. Fl. 330; Santapau in RBSI. 16(1) : 168, 1953.

A large shrub to moderate-sized tree, branching from base. Bark greyish-white. Leaves $6-13 \times 4-8$ cm., elliptic, elliptic-oblong or obovate. Young foliage soft and sticky beneath; mature ones coriaceous. Flowers white, scented, in lax, terminal, dichotomous cymes. Corona of numerous scales. Follicles deep green, $12-30 \times 1$ cm., pendent, joined. Seeds linear; coma basal.

A characteristic tree of the Ridge where it is common especially in depressed areas. On Old Delhi Ridge near Hindu Rao Hospital it is seen to grow abundantly producing a denser patch of trees. Easily recognizable by its greenish-yellow leaves, white flowers with coronary scales and long, pendent follicles.

Flowers : May-Sept. Fruits : Greater part of the year

J. K. Maheshwari 201; 519, Old Delhi Ridge

64. Asclepiadaceae

- Filaments free; pollinia granular *Cryptostegia*
 Filaments connate into a tube; pollinia waxy;
 Anthers with a membranous appendage;
 Habit erect *Calotropis*
 Habit climbing;
 Follicles echinate *Pergularia*
 Follicles not echinate;
 Leaves narrow; flowers white or pink, veined with purple,
 rather showy *Oxystelma*
 Leaves broad;
 Corolla salver-shaped; flowers pale yellow *Telosma*
 Corolla rotate;
 Pollinia pendulous from the corpuscle; corolla
 divided nearly to the base *Pentstemon*
 Pollinia erect on the corpuscle;
 Coronary filaments stellately spreading, fleshy;
 pollinia oblong *Dregea*
 Coronary filaments rounded or depressed;
 pollinia globose *Tylophora*
 Anthers without a membranous tip;
 Corolla tube more or less elongate and often inflated at the base;
 Leafless, erect shrubs *Orthanthera*
 Leafy twiners or climbers;
 Herbs; flowers violet-purple *Ceropegia*
 Shrubs; flowers white, waxy *Stephanotis*
 Corolla tube short; limb rotate *Leptadaenia*

Cryptostegia R. Br.

C. grandiflora R. Br. in Bot. Reg. t. 435, 1819; FBI. 4 : 6; Merr. Enum.
 3 : 340; Parker, For. Fl. 341.

A large, straggling or climbing shrub or liana. Leaves elliptic or
 oblong, glossy. Flowers large, pale purple or rosy, showy. Follicles
 woody, 2-winged.

Naturalized on the Ridge, growing as a liana, or the branches twining
 among themselves. The plant received attention as a possible wartime
 source of vegetable rubber. Common in the sandy beds near Okhla
 where a plantation, said to be more than 25 years old, was established on
 the right bank of the river and attempts were made to produce rubber,
 hence its local name. Also planted in other parts.

Local name : Rabar ki bel; Aaksan; Chabuk-chari

Flowers : June-Sept.

J. K. Maheshwari 213

Calotropis R. Br.

C. procera (Ait.) R. Br. in Ait. f. Hort. Kew. 2 : 78, 1811; FBI. 4 : 18; FUGP. 2 : 48; Parker. For. Fl. 342.

Asclepias procera Ait. Hort. Kew. 1 : 305, 1789.
An erect or decumbent shrub. Young foliage hoary. Leaves thick, ovate-oblong or elliptic, subamplexicaul, 10-17 × 8-12 cm. Flowers purplish-red, pale silvery outside, strong-smelling, in terminal and axillary, corymbose cymes. Follicles recurved, smooth. Seeds flat, with a silky-white coma.

Common in open, waste, sandy, dry places. The leaves and latex are used in various body troubles. The coal from the roots is used in crackers. The leaves are commonly infected by *Cercospora* sp.

Local name : Ak; Akra; Ankta; Madar

Flowers and Fruits : March-July

J. K. Maheshwari 24, Najafgarh

Pergularia Linn.

P. daemia (Forsk.) Blatt. & McC. in JBNHS. 36(3) : 528, 1933.

Asclepias daemia Forsk. Fl. Aegypt.-Arab. 51, 1775.

Pergularia extensa N. E. Br. in Dyer, Fl. Cap. 4(1) : 758, 1908.

Daemia extensa R. Br. in Mem. Wern. Soc. 1 : 50, 1810; FBI. 4 : 20.

A perennial, bad-smelling, hispid climber. Leaves subsucculent, broad ovate, acuminate, deep cordate, 5-10 × 4.5-7 cm. Flowers yellowish-green or greenish-white, tinged with pink at base. Follicles curved backwards, softly spiny, 5-8 × 1.5 cm.

Abundant on the Ridge during monsoon months when it twines and spreads upon the trees and shrubs or spreads on the ground. Also found in other parts twining on telegraph wires and other supports.

Local name : Aaksan

Flowers : March-Sept. Fruits : March-Oct.

J. K. Maheshwari 393

Oxystelma R. Br.

O. secamone (Linn.) K. Schum. in Engl. & Prantl, Nat. Pfam. 4(2) : 229, 1895.

Periploca secamone Linn. Mant. 216, 1771.

Oxystelma esculentum R. Br. in Mem. Wern. Soc. 1 : 40, 1810; FBI. 4 : 17.

A glabrous twiner. Leaves thin, narrowly lanceolate, usually 10 × 0.4 cm. Flowers whitish with purple. Follicles glabrous, 5-6 cm. long, ovoid-lanceolate, pointed.

Common near Okhla in sandy, alkaline soils, where it twines on *Tamarix* spp.

Flowers and Fruits : July-Sept.
J. K. Maheshwari 291, Okhla

Telosma Coville

T. pallida (Roxb.) Craib in Kew Bull. 418, 1911; Blatt. in JBNHS. 36(3): 531, 1933.

Asclepias pallida Roxb. Hort. Beng. 20, 1814, nom. nud. & Fl. Ind. 2: 48, 1832.

Pergularia pallida Wt. & Arn. in Wt. Contrib. 42, 1834; FBI. 4: 38; FUGP. 2: 59.

A twining shrub. Leaves ovate, thin, acute, cordate. Flowers yellowish, in axillary, umbelliform cymes. Follicles usually solitary, 7-10 × 1.7-2.3 cm., deeply grooved on the side.

Occurs on the Ridge and adjacent hilly tracts near Mehrauli as well as in other parts, spreading and twining upon itself or on other shrubs. Also cultivated along the trellis for its foliage.

Flowers : July-Sept. Fruits : Sept.-March

J. K. Maheshwari 820, near Gurukul (Faridabad); 849, Azadpur Road; 874

Pentatropis R. Br.

P. spiralis (Forsk.) Decne. in Ann. Sc. Nat. (sér. 2) 9: 328, 1838; FBI. 4: 19; Parker, For. Fl. 343.

Asclepias spiralis Forsk. Fl. Aegypt.-Arab. 49, 1775.

Pentatropis cynanchoides R. Br. in Salt. Voy. Abyss. Append. 64, 1814; FUGP. 2: 52.

A slender, twining shrub. Leaves ovate-lanceolate, cordate, smooth, 2.5-5 × 1-2 cm. Flowers greenish-yellow or pale yellow, pendent, in umbelliform cymes. Buds 5-cornered at base. Follicles glabrous, lanceolate.

Occurs on the Ridge as well as in other parts, either twining upon the trees and thorny shrubs or spreading and twining upon itself.

Flowers : July-Sept.

J. K. Maheshwari 718; 873, Okhla

Dregea E. Mey. nom. cons.

D. volubilis Benth. ex Hook. f. in FBI. 4: 46, 1883; Parker, For. Fl. 349.

Marsdenia volubilis Cooke, Fl. Pres. Bomb. 2: 166, 1904.

A stout, woody, hoary-pubescent twiner. Branches rather densely lenticellate. Leaves 7.5-15 × 6.5-11 cm., broad ovate to suborbicular, cordate or rounded, acuminate. Flowers green, in dense, drooping umbels which are sometimes several together. Follicles paired, divaricate, tapering from base, 8-10 × 4 cm.

Rare. Met as a climber on trees or in absence of a support it lies prostrate on the ground. Collected from a tree growing along the road to Azadpur.

Flowers : April-June. Fruits : Aug.-Oct.
J. K. Maheshwari 399 ; 851, Gurmandi (Azadpur Road)

Tylophora R. Br.

T. indica (Burm. f.) Merr. in Philip. Jour. Sci. (Bot.) 19 : 373, 1921 ; Santapan in RBSI. 16(1) : 174, 1953.

Cynanchum indicum Burm. f. Fl. Ind. 70, 1768.

Asclepias asthmatica Linn. f. Suppl. 171, 1781.

Tylophora asthmatica Wt. & Arn. in Wt. Contrib. 51, 1834 ; FBI. 4 : 44.

This species is included here on authority of M. B. Raizada (see Ind. For. 76 : 492, 1950) who recorded its occurrence from Delhi on the basis of a plant collected by W. R. Mustoe in 1924.

A climber with long, fleshy roots. Leaves ovate, rounded or oblong, coriaceous, pubescent or tomentose. Flowers dull yellow and purple within, in few or many-flowered umbels. Follicles very variable, divaricate.

Orthanthera Wt.

O. viminea Wt. & Arn. in Wt. Contrib. 48, 1834 ; FBI. 4 : 64 ; FUGP. 2 : 65 ; Parker. For. Fl. 352.

Although this plant has not been observed wild in the field, I have learnt from local people that it grows commonly at a place called 'Phandkargar Sahar ki Thali' situated near villages Bijwasan and Ghadi on Delhi to Rewari railway line. It is said that a small group of natives use the fibre of the stem in making ropes and sell their products in the market.

A small, erect, leafless shrub with stiff, glabrous branches. Flowers dull brown, in compact, woolly cymes. Corolla salver-shaped. Follicles solitary, erect, linear.

Common about Delhi (see Stewart, Punj. Pl. 146, 1869 & Duthie, FUGP. 2 : 65, 1911).

Local name : Khip

Ceropegia Linn.

C. bulbosa Roxb. Pl. Cor. 1 : 11, t. 7, 1795 & Fl. Ind. 2 : 28 ; FBI. 4 : 67 ; FUGP. 2 : 66.

A twining, slender herb. Leaves very variable, up to 5×1.5 cm. Flowers violet-purple, few, in peduncled, umbellate cymes. Corolla tube inflated at the base.

Rare on the Ridge amongst the red sandstones.

Flowers and Fruits : Rainy season

J. K. Maheshwari 1446, New Delhi Ridge

Stephanotis Thouars

S. floribunda Brongn. in Ann. Sc. Nat. (sér. 2) 7 : 30, 1837 ; Bailey. Man. Cult. Pl. 817.

Climbing, glabrous shrub, up to 4.5 m. high. Leaves leathery, broad ovate, cordate, shining. Flowers white, waxy, in axillary cymes.

Native of Madagascar. Grown in gardens for its handsome foliage and waxy-white, fragrant flowers.

Flowers : Summer and rainy seasons

Leptadaenia R. Br.

Leafy, twining shrubs

Almost leafless, erect shrubs *L. reticulata*

L. reticulata Wt. & Arn. in Wt. Contrib. 47, 1834 ; FBI. 4 : 63 ; FUGP. 2 : 63.

A diffuse, much-branched, robust climber. Leaves 5-13 x 4-10 cm., ovate, cordate, coriaceous. Cymes lateral or subaxillary, umbelliform, many-flowered. Flowers pale yellow. Follicles usually solitary, straight, hard, smooth, with a thick, curved beak.

Common in hedges and shrubberies of gardens, also around telegraph poles and wires.

Flowers : Rainy season. Fruits : Winter

J. K. Maheshwari 850, University Campus

L. pyrotechnica (Forsk.) Decne. in Ann. Sc. Nat. (sér. 2) 9 : 269, 1838 ; Blatt. in JBNHS. 36 : 533, 1933.

Cynanchum pyrotechnicum Forsk. Fl. Aegypt.-Arab. 53, 1775.

Leptadaenia spartium Wt. Contrib. 48, 1834 ; FBI. 4 : 64 ; FUGP. 2 : 63.

An erect, glabrous, much-branched, almost leafless shrub, about 1.5 m. high. Leaves few, often unequal, usually on young shoots only. Flowers yellow, in lateral cymes. Follicles terete ; beak long, slender.

A few plants occur near Suraj Kund (Gurukul, Faridabad) and in the vegetative condition appear like *Ephedra*. Also found on the unused grounds inside Lodi Gardens.

Flowers : June-Sept.

J. K. Maheshwari 723, near Gurukul (Faridabad)

65. Loganiaceae

Leaves ovate to lanceolate ; flowers in spikes *Buddleja*
 Leaves round-ovate to suborbicular ; flowers in umbels *Nicodemia*

Buddleja Linn.

The correct spelling of this genus has been taken from Sprague's note in
 Kew Bull. 349, 1928.

Leaves lanceolate ; flowers white *B. asiatica*
 Leaves ovate ; flowers violet *B. lindleyana*
 Leaves ovate-oblong ; flowers orange *B. madagascariensis*

B. asiatica Lour. Fl. Cochinch. 72, 1790 ; Parker, For. Fl. 354 ; Merr.
 Enum. 3 : 316 ; Bailey, Man. Cult. Pl. 804.

A large shrub. Young branches with white or buff-coloured tomentum. Leaves 10-20 × 2.5-4 cm., lanceolate, acuminate, fluffy-white beneath. Flowers white, deliciously fragrant, in slender, drooping panicles.

Grown commonly in hedges, shrubberies and gardens for its fragrant blooms.

Flowers and Fruits : Feb.-June

J. K. Maheshwari 89

B. lindleyana Fort. in Lindl. Bot. Reg. 25, 1844 ; Bailey, Man. Cult. Pl. 804.

A large shrub. Leaves ovate, pale yellow beneath, dark green above. Flowers purplish-violet, in dense, erect, long spikes. Corolla granular-pubescent outside.

Grown in the shrubberies of gardens.

Flowers : July-Sept.

J. K. Maheshwari 246

B. madagascariensis Lamk. Encycl. 1 : 513, 1785 ; Parker, For. Fl. 355 ; Bailey, Man. Cult. Pl. 804.

A shrub. Leaves ovate-oblong, deep green above. Flowers orange, in terminal panicles.

Grown in the shrubberies for its flowers.

Flowers : Jan.-March

J. K. Maheshwari 758

Nicodemia Tenore

N. diversifolia Tenore, Cat. Ort. Napol. 88, 1845 ; Parker, For. Fl. 355.

A straggling shrub with woody branches. Leaves round-ovate or suborbicular, glabrous, usually lobed in the upper part. Inflorescence rusty-tomentose. Flowers yellow, dull-looking, in compound, axillary and terminal umbels.

Grown in gardens as hedge.

Flowers : Oct.-Dec.

J. K. Maheshwari 761, Lodi Gardens

66. Gentianaceae

Terrestrial herbs :

Flowers white, in sessile, axillary clusters

Enicostema

Flowers usually pink, in dichotomous cymes

Centaurium

Aquatic herbs

Nymphoides

Enicostema Bl. nom. cons.

E. verticillatum (Linn.) Engl. Pflanzenw. Ost.-Afr. C. 313, 1895 ; Engl. & Prantl. Nat. Pfam. 4 : 67, f. 31.

Gentiana verticillata Linn. Syst. 952, 1759.

Enicostema littorale Bl. Bijdr. 848, 1826 ; FBL 4 : 101 ; FUGP. 2 : 73.

An erect or procumbent, glabrous herb, 10-25 cm. tall. Leaves decussate, $2.5-6 \times 0.5-1$ cm., ovate-lanceolate to linear. Flowers white, in whorled clusters, usually 3 in the axil. Stigmas large, bilobed. Capsules subglobose, about 6×4 mm. Seeds minute, brown, foveolate.

Uncommon. Found in small patches here and there ; collected from the lawns of University Campus on moist, sandy places and slopy crevices. Also met in the hilly tracts.

Flowers and Fruits : June-Sept.

J. K. Maheshwari 381

Centaurium Hill

C. ramosissimum Druce in Rep. Bot. Exch. Club Brit. Isles, 1915, 4 : 274, 1916.

Erythraea ramosissima Pers. Syn. 1 : 283, 1805 ; FBL. 4 : 101 ; FUGP. 2 : 74.

An erect, glabrous, elegant herb, 5-10 cm. tall. Leaves decussate, ascending, $1-2.5 \times 0.8-1.5$ cm., closely leafy, variable in shape. Flowers rosy, sometimes dull white, in conspicuously bracteate, axillary and terminal, dichotomous cymes forming a lax head. Capsules as long as or longer than the calyx, many-seeded. Seeds minute, ovoid, black, reticulate.

Grows on moist, sandy and silty soils of Jamuna Banks. In the months of April and May 1955, I saw the plant growing in abundance along Jamuna Banks. Also common near village Gheora in waste places along railway lines. Occasionally it is met with in the fields of Delhi and lawns of University Campus. The rosy flowers are extremely attractive and may be used for gardening.

Local name : Ratanjot
Flowers and Fruits : Feb.-May
J. K. Maheshwari 624

Nymphoides Hill

N. cristatum (Roxb.) Kuntze, Rev. Gen. 429, 1891.

Menyanthes cristata Roxb. Pl. Cor. 2 : 3, t. 105, 1799.

Limnanthemum cristatum Griseb. Gen. & Sp. Gent. 342, 1839 ; FBI.
4 : 131 ; FUGP. 2 : 79.

An aquatic, floating herb, spreading by runners. Leaves 4-8 x 4-10 cm., suborbicular, deep cordate, purplish beneath. Flowers white, about 1.5 x 2 cm., in clusters at the base of petiole. Corolla lobes within with a median crest down the middle and a tuft of white hairs round the throat. Uncommon in the temporary ponds near Shahdara. Grown in the fresh water ponds and tanks.

Flowers : Summer and rainy seasons
J. K. Maheshwari 242 ; 1125

67. Hydrophyllaceae

Hydrolea Linn. nom. cons.

H. zeylanica (Linn.) Vahl, Symb. Bot. 2 : 46, 1791 ; FBI. 4 : 133 ; FUGP. 2 : 80 ; Santapau in RBSI. 16(1) : 184, 1953.

Nama zeylanica Linn. Sp. Pl. 226, 1753.

An erect, annual herb. Leaves lanceolate, narrowed at ends, membranous. Flowers blue, in short, terminal racemes. Bracts foliar. Calyx glandular-pubescent. Capsules small, enclosed in the calyx.

A weed in paddy fields on moist or wet ground; collected once on 4-10-1953 in a rice field on moist situations.

Flowers : Sept.-Oct.

J. K. Maheshwari 499, Najafgarh

68. Boraginaceae

Ovary entire or slightly 4-lobed ; style terminal ; herbs or undershrubs :

Styles 2 ; drupes of 4, 1-seeded pyrenes ; prostrate herbs

Style elongated, dilated above in a ring ; drupes of 4, 1-seeded pyrenes ; herbs or undershrubs *Coldenia*

Ovary deeply 4-lobed ; fruits usually of 4 nutlets ; herbs : *Heliotropium*

Anthers connivent in a cone ; connectives much produced and twisted together at the apex ; herbs *Trichodesma*

Anthers not connivent in a cone, included ; style gynobasic

Flowers bluish-purple; nutlets densely glochidiate *Cynoglossum*

Flowers bright yellow, dimorphic ; nutlets not glochidiate but tuberculate *Arnebia*

Coldenia Linn.

C. procumbens Linn. Sp. Pl. 125, 1753 FBI. 4 144 FUGP 2 88
Santapau in RBSI. 16(1) 185, 1953.

A procumbent, deep-rooted, hairy herb with trailing, stout stem lying flat on the ground. Leaves 2.5-4 × 1-1.5 cm., crisped, obovate-oblong, coarsely serrate or subpinnatifid. Flowers white, small, solitary, axillary. Drupes pyramidal, 4-lobed, separating into 4, 1-seeded pyrenes.

Common during the summer months in the dried canal of Najafgarh where it spreads in abundance along with *Heliotropium supinum* Linn., *Chrozophora parvifolia* Klotz., *Glinus lotoides* Linn., and others, forming a felt on the ground.

Flowers and Fruits : May-June

J. K. Maheshwari 675, dried up canal of Najafgarh

Heliotropium Linn.

Calyx broader than the corolla, sepals broad, enclosing the fruit. Prostrate, villous annuals *H. supinum*

Calyx narrow, sepals narrow, not enclosing the fruit :

Corolla lobes acuminate. A woody, hispid herb or undershrub *H. subulatum*

Corolla lobes not acuminate :

An erect herb, branching from a woody base ; leaves broader, elliptic to obovate *H. eichwaldi*

A small, procumbent herb; leaves narrow, linear *H. strigosum*

H. supinum Linn. Sp. Pl. 130, 1753 ; FBI. 4 : 149 ; FUGP. 2 : 91 ; Santapau in RBSI. 16(1) : 186, 1953.

A prostrate or decumbent, villous herb. Leaves 1.25-2.5 × 1-1.5 cm., elliptic, ovate or suborbicular, plicate. Flowers white, sessile, in simple or forked, short spikes. Fruits ovate to subglobose. Nutlets 2-4, enclosed by the persistent calyx.

Grows commonly on dry, hard, clayey soil in the bed of Najafgarh Drain, in association with *Coldenia procumbens* Linn., *Glinus lotoides* Linn., *Chrozophora parvifolia* Klotz., and others.

Flowers and Fruits : May-June

J. K. Maheshwari 674

H. subulatum Hochst. ex DC. Prodr. 9 : 528, 551, 1845 ; FUGP. 2 : 91.
H. zeylanicum Cl. in FBI. 4 : 148, 1883 (non Lamk.) ; Wt. Ic. t. 892.

A woody, hispid herb or undershrub. Main stem erect or lying on the ground, much-branched. Leaves $2.5-6 \times 0.5-1$ cm., narrowly lanceolate. Flowers greenish-yellow, in elongated, 1 to 2-ranked spikes. Corolla lobes acuminate, spreading. Nutlets 4, tuberculate on the back. Occurs at some spots in rocky tracts, mainly on the Ridge.

Flowers and Fruits : Aug.-April

J. K. Maheshwari 635, Old Delhi Ridge ; 724, near Gurukul (Faridabad)

H. eichwaldi Steud. ex DC. Prodr. 9 : 535, 1845 ; FBI. 4 : 149 ; FUGP. 2 : 92.

An erect, rough, woolly-tomentose herb, branching from a woody base. Leaves $2.5-6 \times 2-3.5$ cm., elliptic-oblong or obovate, glabrous to touch. Flowers white, paired, in short, cbracteate spikes, helicoid at the apex when young. Nutlets 4, ellipsoid, round at ends, minutely verrucose.

Common in waste places, gardens and fields in dry, sandy or sandy-clayey soils. A medicinal herb.

Local name : Kadhera ; Kameda ; Karera

Flowers and Fruits : March-June

J. K. Maheshwari 50, Timarpur ; 871, University Campus

H. strigosum Willd. Sp. Pl. 1 : 743, 1798 ; FBI. 4 : 151 ; FUGP. 2 : 93 ; Merr. Enum. 3 : 378.

A prostrate or often procumbent, much branched, perennial, deep-rooted herb. Leaves $0.8-2 \times 0.15-0.3$ cm., linear. Flowers white. Calyx accrescent. Fruits globose, of 4 nutlets.

Common in different situations ranging from a dry crevice to a moist, shady place. A paste of the herb is used for treatment of wounds between the finger bases.

Local name : Panachuni ; Jhunkdi

Flowers and Fruits : During and after rains

J. K. Maheshwari 150, Okhla

Trichodesma R. Br. nom. cons.

T. amplexicaule Roth, Nov. Pl. Sp. 104, 1821 ; FBI. 4 : 153 ; Santipau in RBSI. 16 (ed. 2) : 147, 1960.

T. indicum Linn. var. *amplexicaule* Cooke, Fl. Pres. Bom'b. 2 : 215, 1904.

An erect or diffuse, hispid herb with a long tap root and bulbous-based, stiff hairs. Leaves $4-7 \times 1.5-2.5$ cm., ovate, elliptic or lanceolate, cordate or semi-amplexicaul. Flowers blue or violet, solitary, in leaf-opposed or extra-axillary, leafy racemes. Corolla funnel-shaped. Nutlets smooth, polished on the back.

Common on the Ridge as well as in fields and along roadsides during the monsoon period.

Flowers and Fruits : After rains

J. K. Maheshwari 375, Old Delhi Ridge

Cynoglossum Linn.

C. lanceolatum Forsk. Fl. Aegypt.-Arab. 41, 1775 (non Heyne); FBL 4 : 156 ; FUGP. 2 : 96 ; Merr. Enum. 3 : 379.

C. micranthum Desf. Tabl. Hort. Par. 220, 1804.

An erect, hispid herb, 0.6 m. or more in tallness. Leaves lanceolate. Racemes elongating in fruit, 12-20 cm. long. Flowers small. Nutlets about 3×2 mm., shortly ovate, densely glochidiate.

A weed occurring as an undergrowth in the fruit orchards, on moist, sandy-clayey soils.

Flowers and Fruits : Aug.-Sept.

J. K. Maheshwari 407, Azadpur Gardens

Arnebia Forsk.

A. hispidissima (Lehm.) DC. Prodr. 10 : 94, 1846 ; FBL 4 : 176 ; FUGP. 2 : 97.

Lithospermum hispidissimum Lehm. Icon. Nov. Stirp. t. 39, 1821.

A diffuse or prostrate, very hispid herb. Tap root red. Leaves $30-60 \times 4-6$ mm., lanceolate to linear-lanceolate. Flowers yellow or yellowish-white, in secund, hirsute spikes. Nutlets ovoid-conic, acute, tuberculate. The plants are dimorphic with long- and short-styled flowers.

A xerophytic herb, found in dry, sandy or sandy-clayey soils. The red tap roots are used for colouring hair oils.

Local name : Ratanjot

Flowers and Fruits : Oct. and April

J. K. Maheshwari 733, Lodi Gardens

69. Ehretiaceae

| | |
|-------------------------------|----------------|
| Style terminal, 4-fid ; trees | <i>Cordia</i> |
| Style 2-fid ; trees or shrubs | <i>Ehretia</i> |

Cordia Linn.

Leaves alternate, broad ovate, elliptic to suborbicular, with basal nerves

Leaves subopposite, oblong to oblanceolate, with no distinct, basal nerves

C. dichotoma Forst. f. Prodr. 18, 1786 ; Merr. Enum. 3 : 373 ; Santapau in RBSI. 16(1) : 185, 1953.

C. obliqua Willd. Phytogr. 4, t. 4, 1794; FBI. 4:137 (excl. vars.).
C. myxa auct. plur. (non Linn.).

A small or medium-sized, deciduous tree. Trunk usually crooked. Bark grey, brown or shining whitish. Leaves broad ovate, elliptic to suborbicular, 8-15 × 6-10 cm., leathery. Flowers white, in lax, terminal and axillary cymes. Calyx accrescent. Drupes ovoid, cream-coloured, apiculate.

Wild on the Ridge and found in waste places around villages. Also planted in gardens and shrubberies for its medicinal fruits which are eaten either raw or pickled.

Local name: Lasoora; Liasaura

Flowers: Jan.-April. Fruits: May-July

J. K. Maheshwari 702, University Campus; 1074, Ridge

C. rothii Roem. & Schult. Syst. 4:798, 1819; FBI. 4:138; FUGP. 2:85; Parker, For. Fl. 358.

An erect or crooked tree, branching from base. Bark grey-white to dull black, peeling off in longitudinal flakes. Leaves oblong to oblanceolate, 5-12 × 3 cm., scabrous, pendent. Flowers white, in lax, terminal or axillary cymes. Drupes ovoid, reddish-brown when ripe.

Wild on the Ridge and adjacent hilly tracts on gravelly, stony soil; often bent. Common on New Delhi Ridge. Fruits are edible and usually sold in the market. The pulp is not so viscid as in *C. dichotoma* Forst. f.

Local name: Gondī; Gondni

Flowers: April-June. Fruits: Cold season

J. K. Maheshwari 832, near Qutab

Ehretia Linn.

Leaves serrate

Leaves entire:

E. acuminata

Small trees; leaves ovate to elliptic, glabrous beneath *E. laevis*

Shrubs; leaves usually obovate or spatulate, pubescent beneath *E. aspera*

E. acuminata R. Br. Prodr. 497, 1810; FBI. 4:141; FUGP. 2:86; Merr. Enum. 3:374.

A moderate-sized, deciduous tree, branching from above the ground. Bark grey. Leaves 8-13 × 3.5-5 cm., elliptic or ovate-oblong, sharply serrate. Flowers white, in fascicles, forming large, dense, compound panicles. Drupes 6 × 5 mm. across, orange-coloured.

A handsome tree when in full bloom. Some trees have been planted in the campus of Rashtrapati Bhavan where they flower and fruit annually.

Flowers: March-April. Fruits: June-July

J. K. Maheshwari 938; 1144

E. laevis Roxb. Pl. Cor. 1 : 42, t. 56, 1796 ; FBI. 4 : 141 ; FUGP. 2 : 86 ; Parker. For. Fl. 360.

A small, deciduous tree with spreading branches. Trunk whitish. Leaves elliptic or obovate, 6.5-12.5 x 3-9 cm. Flowers white, in cymes of unilateral spikes or racemes. Drupes orange at first, becoming black and wrinkled when dry, 6-8 mm. across.

Common on the Ridge, where it shows irregular flowering. Also planted in the village shrubberies and along roadsides. The young twigs are used as fodder.

Local name : Papri ; Desi papri

Flowers : June ; Dec.-March. Fruits : June-July

J. K. Maheshwari 867

E. aspera Willd. Phytogr. 4, t. 2, f. 1, 1794 ; FUGP. 2 : 87.

A shrub with short, terete, glabrous branches, downy when young. Bark greenish or grey-white. Leaves variable, elliptic, obovate or spatulate, scabrous and shortly hairy above, persistently hairy beneath. Flowers white, in dense, corymbose cymes becoming paniculately lax later.

Occurs on the Ridge as a short, woody, spreading or diffuse shrub amongst gravel and stones.

Flowers : June-Aug.

J. K. Maheshwari 1104, Ridge

70. Convolvulaceae

Flowers numerous, in large panicles ; capsules 1-seeded, indehiscent

Porana

Flowers solitary or in cymes ; capsules valvular or opercular :

Styles 2 or 2-fid :

Flowers white, solitary or passing into terminal clusters in upper axils ; styles 2

Cressa

Flowers blue, solitary or in few-flowered cymes ; styles 2, each 2-fid.

Evolvulus

Style 1, undivided :

Fruits indehiscent, baccate, coriaceous or crustaceous :

Flowers white, salverform ; stigmas linear-oblong

Rivea

Flowers rosy or purple, funnelform ; stigmas globose

Argyreia

Fruits usually dehiscent with valves, coriaceous, membranous or brittle :

Stigmas globose ; ovary 2 to 4-celled :

Stems winged ; capsules dehiscing circumsciss or irregular

Operculina

Stems not winged; capsules dehiscing valvular. *Ipomoea*
 Stigmas with ovate or elongate lobes; ovaries 2-celled.
 Prostrate, trailing herbs; stigmas linear. *Convolvulus*
 Climbers, rarely prostrate; stigmas elliptic. *Jacquemontia*

Porana Burm. f.

P. paniculata Roxb. Pl. Cor. 3 : 31, t. 235, 1815; FBI. 4 : 222; FUGP. 2 : 102; Parker. For. Fl. 362.

A large, climbing, hoary-hairy shrub. Leaves 5-10 × 4-8 cm., ovate, cordate, acuminate. Flowers small, white, numerous, in large, axillary and terminal, drooping panicles.

Native of India. Grown for ornamental purposes along walls and trellises in gardens.

Local name : Dela ; English name : Bridal creeper

Flowers : Oct.-Jan.

J. K. Maheshwari 1166, Mughal Gardens

Cressa Linn.

C. cretica Linn. Sp. Pl. 223, 1753; FBI. 4 : 225; FUGP. 2 : 103; Parker, For. Fl. 361.

A small, erect, densely branched annual, about 15 cm. tall. Leaves crowded, densely hairy, ascending. Flowers white, in small clusters in the axils of upper leaves. Corolla lobes reflexed. Stamens exserted. Capsules ovoid, pointed.

Common in the sandy and saline tracts and cultivated fields of Timarpur and Karnal Road. Used as a cooling medicine.

Local name : Nunki

Flowers and Fruits : May-July

J. K. Maheshwari 168, Timarpur

Evolvulus Linn.

E. alsinoides Linn. Sp. Pl. 392, 1762; FBI. 4 : 220 ; FUGP. 2 : 104 ; Merr. Enum. 3 : 357 ; Santapau in RBSI. 16(1) : 190, 1953.

Convolvulus alsinoides Linn. Sp. Pl. 157, 1753.

A spreading or ascending, much-branched, densely hairy herb. Branches several from a woody rootstock. Leaves distichous, clothed with appressed pubescence. Flowers light blue or blue, in 1 to 3-flowered, axillary, filiform peduncles. Capsules 4-seeded. Seeds irregular, glabrous, very dark brown.

Common throughout on moist or dry, sandy soils. Occurs on the Ridge in gravelly soil or in the crevices of stones.

Flowers and
J. K. Maheshwari

Rivea Choisy

R. hypocraterifolia
FBI. 4 : 184

A climbing
sed-silky beneath
Flowers white
sometimes 2 c

Common in
hilly tracts near
ing on shrubs
Butea monosperma
nearly related
flowers remain
purplish-black

Local name

Flowers

J. K. Maheshwari

Argyreia L.

A. nervosa

371; Santapau

Convolvulus

Argyreia

A large

glabrous and

in subcapitate

Cultivated

with *Ipomoea*

latter, stems

Local name

Operculina

O. turpet

FUGP.

Convolvulus

Ipomoea

A stem

ovate to

flowered

Flowers and Fruits : July-Nov.
J. K. Maheshwari 350, Hauz Khas

Rivea Choisy

R. hypocrateriformis Choisy in Mem. Soc. Phys. Genève 6 : 408, 1833 ;
FBI. 4 : 184 ; FUGP. 2 : 119 ; Parker, For. Fl. 363.

A climbing or spreading, stout shrub. Leaves $5.7 \times 6.7.5$ cm., appressed-silky beneath, with a pair of purplish glands at the base of lamina. Flowers white, clove-scented, usually solitary, axillary; peduncles sometimes 2 or more flowered. Fruits globose.

Common near the 'Malka View' on the Ridge. Also found in the hilly tracts near Gurukul (Faridabad) and Mehrauli, climbing and spreading on shrubs and trees. In the area near Gurukul, it is found often on *Butea monosperma* Taub., and hence its local name. The plant is very nearly related to *Rivea ornata* Choisy, and needs field observations. The flowers remain closed during the day. The leaves of detached plants turn purplish-black.

Local name : Dhak ki bel ; Amarbel

Flowers : Aug.-Sept. Fruits : Oct.-Nov.

J. K. Maheshwari 1147, Mehrauli ; 1232, near Gurukul (Faridabad)

Argyreia Lour.

A. nervosa (Burm. f.) Boj. Hort. Maurit. 224, 1837 ; Merr. Enum. 3 : 371 ; Santapau in RBSI. 16(1) : 194, 1953.

Convolvulus nervosus Burm. f. Fl. Ind. 48, t. 20, f. 1, 1768.

Argyreia speciosa Sweet, Hort. Brit. 289, 1827 ; FBI. 4 : 185.

A large climber with white-tomentose stems. Leaves ovate, cordate, glabrous above, densely white-tomentose beneath. Flowers rosy-purple, in subcapitate cymes. Bracts large, foliar.

Cultivated for its handsome flowers and foliage. It is often confused with *Ipomoea carnea* Jacq., which is also cultivated in the area. In the latter, stems are fistular and leaves are glabrous on both surfaces.

Local name : Ghabel ; Bansa

Operculina Silva Manso

O. turpethum (Linn.) Silva Manso, Enum. Subst. Bras. 16 & 49, 1836 ;
FUGP. 2 : 110 ; Merr. Enum. 3 : 363.

Convolvulus turpethum Linn. Sp. Pl. 155, 1753.

Ipomoea turpethum R. Br. Prodr. 485, 1810.

A stout, climbing perennial. Stems angled and winged. Leaves ovate to oblong, cordate or truncate at base. Flowers white, in few-flowered cymes. Peduncles stout. Bracts large, subpersistent, often

pinkish. Outer sepals accrescent. Capsules globose, enclosed in the enlarged, brittle calyx segments. Seeds black, round.

A climber on trees in the fruit orchards of Karnal and Azadpur Roads and hedges around fields.

Flowers : Nov.-Dec. Fruits : Jan.

J. K. Maheshwari 559, Azadpur Road

Ipomoea Linn.

Corolla tubular or salver-shaped ; stamens exerted or included ;
Flowers orange or scarlet, in elongate, dichasial, racemiform cymes

Flowers red or purplish, in 1 to few-flowered cymes : *I. lobata*

Stems muricate ; flowers pale purple ; night-bloomers *I. muricata*

Stems not muricate ; flowers red or scarlet :

Leaves ovate-cordate

Leaves with filiform segments *I. angulata*

Corolla campanulate or funnel-shaped ; stamens included : *I. quamoclit*

Large straggling or diffuse shrubs ; flowers pink

Herbaceous or woody twiners, trailers or climbers : *I. carnea*

Floating aquatic or amphibious herbs

Terrestrial plants : *I. reptans*

Prostrate, long-trailing and rooting herbs with edible tuberous roots

Stems twining, not rooting ; roots not tuberous : *I. batatas*

Leaves entire :

Outer sepals sagittate or cordate at the base *I. sinensis*

Outer sepals not cordate at the base :

Flowers in sessile or subsessile heads :

Flowers pink ; capsules hairy *I. eriocarpa*

Flowers white ; capsules glabrous *I. indica*

Flowers in pedunculate, 1 to few-flowered cymes :

Leaves silvery white-woolly beneath ; flowers pink or rosy *I. pilosa*

Leaves not white-woolly beneath :

Flowers small, white with yellow bands and purple at base *I. obscura*

Flowers large, showy, blue or purple :

Sepals short and thick *I. violacea*

Sepals prominently acute *I. purpurea*

Leaves lobed or compound (entire in *I. pes-tigridis* var. *capitellata*) :

Prostrate, glabrous herbs ; leaves digitate ; flowers white *I. coptica*

Twining herbs :

Flowers in dense, long-peduncled heads, surrounded by large bracts *I. pes-tigridis*

Flowers in lax, 1 to few-flowered cymes, not surrounded by large bracts :

Sepals densely hirsute with brown hairs ; leaves digitately 5-foliolate *I. pentaphylla*

Sepals not densely hirsute ; Leaves penta-digitate or palmate ; sepals without ligulate tips *I. cairica*

Leaves 3-lobed ; sepals with long, ligulate tips *I. nil*

I. lobata (Cerv.) Thell. in Vierteljahres. Nat. Ges. Zürich 64 : 775, 1919 ; Bor & Raiz. 8, f. 8.

Mina lobata Cerv. in De La Llave & Lex. Nov. Veg. Desc. fasc. 1 : 3. 1824.

Quamoclit lobata (Cerv.) House in Bull. Torrey Bot. Cl. 36 : 602, 1909. *Ipomoea versicolor* Meissn. in Mart. Fl. Bras. 7 : 200, 1869.

A climber with stout, wiry, intertwining stems and branches, often tinged with purple. Leaves palmately 3-lobed, cordate with a broad sinus, glabrous. Inflorescence an elongate, dichasial, racemiform cyme. Flowers orange and scarlet, soon fading to pale yellow, tubular. Capsules 3 to 4-seeded.

Native of Mexico. Grown in gardens and across the wiry fences.

Flowers : Cold season

J. K. Maheshwari 994, University Gardens

I. muricata (Linn.) Jacq. Hort. Schoenbr. 3 : 40, t. 323, 1798 (non Cav. 1799) ; FBI. 4 : 197 ; Santapau in RBSI. 16(1) : 191, 1953.

Convolvulus muricatus Linn. Mant. 44, 1767.

Calonyction muricatum G. Don. Gen. Syst. 4 : 264, 1837 ; FUGP. 2 : 118.

A twining shrub. Stems muricate. Leaves broad ovate, entire, glabrous, long-petioled, deep cordate ; auricles round. Flowers pale purple, on 1 to 5-flowered peduncles ; pedicels thickened upwards in fruit. Capsules 2.3×1.5 -2 cm., globose, pointed, 4-seeded.

Found on the Ridge during rains, twining upon other Ipomoeas or spreading on the shrubs. The flowers open after dark and fade away next morning.

Flowers and Fruits : Aug.-Nov.

J. K. Maheshwari 1276, Ridge

I. angulata Lamk. Tabl. Encycl. 1 : 464, 1793 ; Santapau in RBSI. 16(1) : 192, 1953.

Quamoclit phoenicea (Roxb.) Choisy in Mém. Soc. Phys. Genève 6 : 433, 1833.

Ipomoea phoenicea Roxb. Fl. Ind. 2 : 92, 1824.

Ipomoea coccinea Cl. in FBI. 4 : 199, 1883 (non Linn.).

Quamoclit coccinea Cooke Fl. Pres. Bomb. 2 : 261, 1904 (non Moench).

A pretty, twining annual. Leaves broad ovate, cordate, acute, glabrous. Flowers red, in few-flowered, long-peduncled cymes, narrowly funnel-shaped.

Grown for ornamental purposes in gardens.

Flowers : Oct.-March

I. quamoclit Linn. Sp. Pl. 159, 1753 ; FBI. 4 : 199 ; Santapau in RBSI. 16(1) : 191, 1953.

Quamoclit pinnata (Desr.) Boj. Hort. Maurit. 224, 1837 ; Bor. & Raiz. 3, f. 1.

Convolvulus pennatus Desr. in Lamk. Encycl. 3 : 567, 1792.

Quamoclit vulgaris Choisy in Mém. Soc. Phys. Genève 6 : 434, 1833.

Quamoclit quamoclit Britton & Brown, Fl. North Unit. Stat. 3 : 22, 1898, nom. illegit.

A glabrous, slender annual. Leaves pinnately divided into filiform segments. Flowers red, on 1 to few-flowered peduncles. Corolla narrowly funnel-shaped.

Grown as an ornamental annual along the trellises and walls of gardens.

Flowers : Winter season

J. K. Maheshwari 1372

I. carnea Jacq. Enum. Pl. Carib. 13, 1760 ; Haines, Bot. Bih. & Or. 600 ; Parker, For. Fl. 365 ; Bor & Raiz. 6, f. 5.

A large, diffuse or straggling, leafy shrub, with milky juice. Stems fistular. Leaves ovate, cordate, acuminate, 15-22 × 10-15 cm. Flowers large, pink, in lax, dichotomous, axillary and terminal cymes.

Grown as an hedge in gardens and along roadsides of villages.

Flowers : Aug.-Feb.

J. K. Maheshwari 396 ; 1165, Najafgarh

I. reptans (Linn.) Poir. in Lamk. Encycl. Suppl. 3 : 460, 1814 ; FUGP. 2 : 114 ; Merr. Enum. 3 : 368.

Convolvulus reptans Linn. Sp. Pl. 158, 1753.

Ipomoea aquatica Forsk. Fl. Aegypt.-Arab. 44, 1775 ; FBI. 4 : 210.

An aquatic, trailing, amphibious herb, rooting at the nodes. Leaves elliptic or ovate-oblong, cordate or hastate. Flowers pale rosy, erect, on 1 to 5-flowered peduncles. Capsules ovoid, glabrous.

Common in ponds, canals, ditches and muddy grounds. The young shoots and leaves are eaten as vegetable.

Local name : Sarnali ; Nali
 Flowers and Fruits : Oct.-Dec.
 J. K. Maheshwari 815

- I. batatas* (Linn.) Lamk. Tabl. Encycl. 1 : 465, 1793 ; FBI. 4 : 202 ; FUGP. 2 : 117 ; Merr. Enum. 3 : 364 ; Santapau in RBSI. 16(1) : 194, 1953.

Convolvulus batatas Linn. Sp. Pl. 154, 1753.

Batatas edulis Choisy in Mém. Soc. Phys. Genève 6 : 435, 1833.

A diffusely spreading, glabrous, tuberous plant, often rooting at the nodes. Tubers white or red. Leaves ovate, cordate, somewhat lobed. Flowers purple, 2 to several, on long, axillary peduncles.

Cultivated for its edible tubers in gardens and fields. The flowers open in the evening.

Local name : Shakarkandi
 Flowers : Nov.-Dec.
 J. K. Maheshwari, cultivated

- I. sinensis* (Desr.) Choisy in Mém. Soc. Phys. Genève 6 : 459, 1833 ; Verdcourt in Kew Bull. 204, 1958.

Convolvulus sinensis Desr. in Lamk. Encycl. 3 : 557, 1792.

Ipomoea calycina Cl. in FBI. 4 : 201, 1883.

A twining, slender annual, with villous stems. Leaves 4-6 x 3-4 cm., ovate, cordate, acuminate. Flowers white, tubular, 1-3 together. Outer sepals with sagittate bases. Capsules ovoid, pointed, deflexed, glabrous.

Rare on the Ridge where it twines on trees and shrubs.

Flowers and Fruits : Sept.
 J. K. Maheshwari 1267, Old Delhi Ridge

- I. eriocarpa* R. Br. Prodr. 484, 1810 ; FBI. 4 : 204 ; Exell, Cat. Vas. Pl. S. Tomé 250.

I. hispida (Vahl) Roem. & Schult. Syst. 4 : 238, 1819 (non Zucc. 1809) ; FUGP. 2 : 113.

Convolvulus hispidus Vahl, Symb. Bot. 3 : 29, 1794.

A robust, twining, villous annual. Leaves broad ovate to triangular-hastate, hairy ; lobes rounded. Flowers pink, in shortly stalked, dense, axillary heads. Capsules hairy, 6-8 x 6-8 mm., globose, 4-seeded ; immature ones purplish.

Occurs on the Ridge twining on *Capparis sepiaria* Linn., and other plants. Met commonly in fields on Jowar and Bajra. Said to be useful in the neck troubles of bulls.

Local name : Ghiabato ; Boota
 Flowers and Fruits : Sept.-Oct.
 J. K. Maheshwari 1268, Old Delhi Ridge ; 1273 ; 1289, Vallabhgarh

I. sinensis Stapf in Kew Bull. 346, 1894; FUGP. 2 : 113.

A slender, twining, hispid herb. Leaves triangular-hastate, acute or acuminate, softly hairy; basal lobes diverging, round. Flowers white, solitary or in few-flowered heads. Bracts and sepals hispid. Corolla funnel-shaped. Capsules glabrous, purplish when young.

Common throughout, twining around the herbs and shrubs. The plant greatly resembles *I. eriocarpa* R. Br.; the latter, however, possesses pink flowers and hairy capsules.

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 423, Ridge

I. pilosa Sweet. Hort. Brit. 289, 1827; FBI. 4 : 213; FUGP. 2 : 114.

An annual, twining shrub. Stems hirsute. Leaves broad ovate, cordate, silvery white-woolly beneath. Flowers pink or rosy, in lax cymes. Sepals narrowly lanceolate, densely hairy. Capsules $10 \times 7-10$ mm., subglobose, hairy towards the apex. Seeds velvety-pubescent.

Common on the Ridge during the monsoon, twining upon trees and shrubs. The flowers open in the morning. The leaves are attacked on the lower surface by a species of *Albugo*.

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 373, Old Delhi Ridge

I. obscura (Linn.) Ker-Gawl. in Bot. Reg. t. 239, 1817; FBI. 4 : 207; FUGP. 2 : 115; Merr. Enum. 3 : 366.

Convolvulus obscurus Linn. Sp. Pl. 220, 1762.

A slender, annual, twining plant, glabrous or slightly villous. Leaves broad ovate, cordate, acute or acuminate, entire. Flowers white with yellow bands, purple at the base, usually on 1-flowered peduncles.

Rare in the hilly tracts.

Flowers : Oct.

J. K. Maheshwari 1333, near Gurukul (Faridabad)

I. violacea Linn. Sp. Pl. 161, 1753.

I. rubro-caerulea Hook. in Bot. Mag. t. 3297, 1834.

I. tricolor Cav. Ic. 3 : 5, t. 208, 1795; Bailey, Man. Cult. Pl. 820.

An extensively twining, glabrous annual. Leaves broadly cordate-ovate, entire, often broader than long. Flowers azure-blue, fading to purplish-red, on axillary, dichotomously branched, 3 to 9-flowered peduncles; pedicels thickened. Capsules 4-valved, 4-seeded.

Native of Mexico. Cultivated for ornamental purposes. Also used for covering walls, trellises and dirty places, due to its rapid and dense growth. The flowers open early in the morning and fade in the evening and hence its common name.

English name : Morning glory; Heavenly blue

Flowers : Nov.-Dec. Fruits : Jan.-Feb.
J. K. Maheshwari 1374

I. purpurea (Linn.) Roth, Bot. Abh. 27, 1787; Bot. & Raiz. 9, f. 9.
Convolvulus purpureus Linn. Sp. Pl. 219, 1762.

A hairy, tall, twining annual. Leaves broadly cordate-ovate, entire.
Flowers purplish or in related colours, funnel-shaped, large, 1-5 or more,
on axillary peduncles.

Grown as an ornamental climber on trellises and walls in gardens.

English name : Morning glory

Flowers : Dec.-March

J. K. Maheshwari 1375

I. coptica (Linn.) Roth, apud Roem. & Schult. Syst. 4 : 208, 1819 &
Nov. Pl. Sp. 140

Convolvulus copticus Linn. Mant. 559, 1771.

Ipomoea dissecta Willd. Phytogr. 5, t. 2, f. 3, 1794; FBI. 4: 200;
FUGP. 2 : 115.

A glabrous, prostrate or twining herb. Leaves digitate; lobes 3-7,
deeply serrate. Flowers white, solitary. Capsules subglobose, glab-
rous.

Found in fallow and cultivated fields of villages on moist, shady
situations, often twining amongst the grasses.

Flowers and Fruits : Sept.-Oct.

J. K. Maheshwari 992, Najafgarh fields

I. pes-tigridis Linn. Sp. Pl. 162, 1753; FBI. 4 : 204; FUGP. 2 : 116;
Merr. Enum. 3 : 367; Santapau in RBSI, 16(1) : 193, 1953.

I. pes-tigridis var. *hepaticifolia* Cl. in FBI. 4: 204, 1883.

I. hepaticifolia Linn. Sp. Pl. 161, 1753.

A spreading or twining, hispid shrub. Leaves deeply palmate, 5
to 7-lobed. Flowers white or pinkish, in long-peduncled heads. Bracts
conspicuous, outer ones larger. Corolla funnel-shaped. Capsules hid-
den in the calyx.

Common on the Ridge during rains either climbing on shrubs and
trees or spreading on the ground. Also met as a weed in fields
and unused grounds. It is a beautiful sight on the Ridge to look at these
blooms when they open abundantly in the afternoon. The leaves are
attacked by a species of *Albugo*.

Local name : Ghiabati

Flowers : Sept.-Oct. Fruits : Oct.-Dec.

J. K. Maheshwari 422, Old Delhi Ridge

I. pes-tigridis Linn. var. *capitellata* Cl. in FBI. 4 : 204, 1883; Haines.
Bot. Bih. & Or. 595.

It differs from the type only in possessing undivided, ovate-cordate leaves.

Flowers and Fruits : Sept.-Dec.
J. K. Maheshwari 1303, Baroli

I. pentaphylla Jacq. Ic. 2 : 10, t. 319, 1786-1793 (non Cav.) ; FBI, 4 : 202.

A twining, hirsute annual. Leaves digitately 5-foliate. Leaflets 5-7.5 x 1.7-2.5 cm., broadly lanceolate, broadest in the middle, acuminate, tapering at ends. Flowers white, funnel-shaped, on long, laxly dichotomous peduncles. Sepals large, densely hirsute with brown hairs. Capsules ovoid, papery.

A new record from the Upper Gangetic Plain. Common on the Ridge during the rainy months, twining or spreading on the shrubs and trees. The seeds are said to be edible.

Local name : Ghiabel

Flowers : Sept.-Oct. Fruits : Nov.-Dec.

J. K. Maheshwari 1261, Old Delhi Ridge ; 1269

I. caurica (Linn.) Sweet, Hort. Brit. 287, 1827 ; Santapau in RBSI, 16(1) : 193, 1953.

Convolvulus cauricus Linn. Syst. 922, 1759.

Ipomoea palmata Forsk. Fl. Aegypt.-Arab. 43, 1775 ; FBI, 4 : 214 ; Bor & Raiz. 6, f. 4, Pl. 1, 2.

I. pulchella Wt. Ic. t. 156, 1839 (non Roth).

A glabrous climber. Leaves digitate, deeply palmately lobed ; lobes elliptic or lanceolate. Peduncles 1 to 3-flowered. Flowers large, pale purple, campanulate.

Grown on trellises as well as in the hedges of gardens and village shrubberies for its flowers and foliage. Also planted as an ornamental climber at railway stations.

Flowers : Rainy season

J. K. Maheshwari 305, Najafgarh

I. nil (Linn.) Roth, Cat. Bot. 1 : 36, 1797 ; Santapau in RBSI, 16(1) : 192, 1953.

Convolvulus nil Linn. Sp. Pl. 219, 1762.

Ipomoea hederacea Cl. in FBI, 4 : 199, 1883 ; FUGP. 2 : 116 ; et al. plur. auct. (non Jacq.).

A twining or spreading shrub. Stems retrorsely hairy. Leaves ovate-cordate, 3-lobed. Flowers deep blue tinged with pink, on 1 to 5-flowered peduncles. Capsules 3-celled, 6-ovuled, subglobose or ovoid, glabrous.

Common on the Ridge and in the plains amongst shrubs or hedges or twining upon other climbers.

Local name : Nilkalmi
 Flowers and Fruits : Aug.-Oct.
 J. K. Maheshwari 199

Convolvulus Linn.

Trailing or twining herbs ; leaves auriculate or hastate at base ; flowers
 pedicellate
 Prostrate or suberect herbs ; leaves not auriculate ; flowers sessile or
 subsessile

C. arvensis Linn. Sp. Pl. 153, 1753 ; FBI. 4 : 219 ; FUGP. 2 : 106 ; San-
 tapau in RBSI. 16(1) : 190, 1953.

A creeping, twining, glabrous herb, spreading on the ground.
 Leaves ovate or oblong-lanceolate ; base auriculate to hastate. Flowers
 pink or white, solitary, axillary, widely funnel-shaped, on long peduncles.
 Capsules globose, glabrous.

A common weed of cultivation, often dominating the fields of wheat,
 gram and cucurbits. It is uprooted from these places and used as
 fodder.

Local name : Hirankhuri
 Flowers and Fruits : July-Oct.

J. K. Maheshwari 307, University Campus

C. pluricaulis Choisy, Convol. Or. 95, 1833 ; FBI. 4 : 218 ; FUGP. 2 :
 105.

A prostrate or suberect, spreading, hairy, perennial herb. Leaves
 ovate-lanceolate to linear. Flowers white or pinkish, solitary or paired.
 Corolla shortly funnel-shaped. Capsules oblong-globose, pale brown ;
 pericarp chartaceous. Seeds brown, minutely puberulous.

Common in sandy and rocky, dry places.

Flowers and Fruits : Major part of the year

J. K. Maheshwari 171, Timarpur ; 490, University Campus

Jacquemontia Choisy

J. pentantha (Jacq.) G. Don, Gen. Syst. 4 : 283, 1838 ; van Ooststroom
 in Fl. Males. (ser. 1) 4(4) : 435, 1953.

Convolvulus pentanthus Jacq. Coll. 4 : 210, 1791.

A climber. Leaves ovate, cordate, entire. Flowers pretty blue,
 in axillary, compound, umbellate cymes. Peduncles long.

A garden plant ; grown for ornamental purposes along trellises,
 poles and walls.

Flowers : Oct.-Dec.

J. K. Maheshwari 991, Mughal Gardens

71. Cuscutaceae

Cuscuta Linn.

Corolla two to three times as long as calyx *C. reflexa*
 Corolla less than twice as long as calyx *C. hyalina*

C. reflexa Roxb. Pl. Cor. 2 : 3, t. 104, 1799 & Fl. Ind. 1 : 446, 1832 ;
 FBI. 4 : 225 ; FUGP. 2 : 110 ; Parker. For. Fl. 364.

A twining, leafless, stem parasite. Branches fleshy, forming dense, yellow masses on trees and shrubs. Flowers pale white, solitary, clustered or in racemes. Corolla lobes reflexed. Stigmas diverging. Capsules depressed-globose.

Common in the hedges of gardens during winter months.

Local name : Amarbel

Flowers : Cold season

J. K. Maheshwari 993, Talkatora Gardens, on *Nyctanthes* sp. ;
 1112, Roshanara Gardens

C. hyalina Roth. Nov. Pl. Sp. 100, 1821 ; Santapau in JBNHS. 47(2) : 339, 1947.

A leafless, filiform, stem parasite, much slender than *C. reflexa* Roxb., and often found on the ground. Branches forming dense, yellow masses on herbage. Flowers pale yellow, bracteate, in dense clusters, tetra- or pentamerous. Corolla scales absent. Stamens exerted in between the corolla lobes. Styles 2, unequal, filiform ; stigmas capitate. Seeds 4, brownish, triangular.

Found during the monsoon period, when it parasitizes rainy season annuals, especially *Tribulus terrestris* Linn., *Cleome viscosa* Linn., *Trianthema govindia* Buch.-Ham., and others. Common in the University Campus along roadsides, producing a yellow colour on the green turf.

Local name : Amarbel

Flowers and Fruits : July-Oct.

J. K. Maheshwari 378, Timarpur, on *Adhatoda vasica* Nees ; 989, University Campus

72. Solanaceae

Calyx inflated, greatly enlarged and enclosing the fruit :

Flowers solitary, yellowish *Physalis*

Flowers clustered, greenish or yellowish *Withania*

Calyx not greatly enlarged and never completely enclosing the fruit :

Fruit a capsule :

Calyx nearly or quite covering the fruit. *Nicotiana*

Calyx much shorter than fruit and reflexed *Datura*

Fruit a berry :

Flowers in axillary or extra-axillary, umbelliform or racemiform cymes or panicles :

Corolla rotate :

Anthers opening by a pore or slit at or near the apex

Anthers opening by long slits

Corolla tubular

Flowers solitary or in twos or threes, axillary :

Spinous shrubs ; plants wild

Spineless herbs or undershrubs ; cultigens

Solanum

Lycopersicon

Cestrum

Lycium

Capsicum

Physalis Linn.

P. minima Linn. Sp. Pl. 183, 1753 ; FBI. 4 : 238 ; FUGP. 2 : 127 ; Merr. Enum. 3 : 423 ; Santapau in RBST. 16(1) : 197, 1953.

A prostrate or erect herb. Stems striate. Leaves 4-10 × 2.5-6.5 cm., ovate, entire or distantly crenate. Flowers yellow, solitary, on slender, deflexed pedicels. Calyx in flower about 5 mm. long, not angular. Berries 8-11 × 8-13 mm., enclosed within the inflated, 5 to 10-ribbed calyx. Seeds discoid or reniform, muriculate.

A weed in fields, waste localities and along roadsides on moist situations. The mature fruits are sold in the market and village children often eat them.

Local name : Papotan

Flowers and Fruits : July-Oct.

J. K. Maheshwari 87 : 240 ; 302, Old Fort

P. minima Linn. var. *indica* Cl. in FBI. 4 : 238, 1883 ; FUGP. 2 : 128.

It differs from the typical plant in the glabrescent leaves and pentangular calyx enclosing the fruit. No basal spots on the corolla.

Local name : Papotan

Flowers and Fruits : July-Oct.

Withania Pauq. nom. cons.

W. somnifera (Linn.) Dunal in DC. Prodr. 13(1) : 453, 1852 ; FBI. 4 : 239 ; FUGP. 2 : 128 ; Parker, For. Fl. 369 ; Santapau in JBNHS. 47(4) : 657, 1948.

Physalis somnifera Linn. Sp. Pl. 182, 1753 ; Wt. Ic. t. 8553.

An erect, stout, branching undershrub, 1.5 m. or less in height, nearly throughout stellate-tomentose. Leaves 7-15 × 4-8 cm., ovate ; base unequal. Flowers greenish or lurid-yellow, usually 5 together, in umbelliform cymes. Stamens inserted. Berries red when ripe, turning dull brown, enclosed in the bladder-like, inflated calyx. Seeds subreniform, pale brown, polished, wrinkled.

Common in waste places and on dry soils near gardens ; often on recently disturbed soils. The plant is in demand for the extraction of an alkaloid somniferin from its roots.

Local name : Asgand

Flowers and Fruits : Jan.-June

J. K. Maheshwari 137, Sarai Rohilla

Nicotiana Linn.

Flowers greenish-yellow ; cultigens

Flowers pinkish or rosy ;

Corolla tube linear, pale pink ; naturalized herbs

N. plumbaginifolia

Corolla tube narrow below, ventricose above, rosy ; cultigens

N. tabacum

N. rustica Linn. Sp. Pl. 180, 1753 ; FBI. 4 : 245 ; Duthie & Fuller, Field & Gard. Crops 1 : 69, t. 17.

A viscid-pubescent annual. Leaves petiolate ; lower ones large, broad ovate or suborbicular ; upper ones smaller and narrower. Flowers greenish-yellow, in terminal, paniculate racemes. Capsules globose.

Cultivated during the cold season.

Local name : Tambaku

Flowers : Nov.-March

J. K. Maheshwari, cultivated

N. plumbaginifolia Viv. Elench. Pl. Hort. Dincgro 26, t. 5, 1802 ; Haines, Bot. Bih. & Or. 616.

An erect, shallow-rooted herb, sticky-glandular throughout, up to 0.6 m. tall. Leaves forming a rosette at base ; upper ones elliptic, ovate-elliptic or lanceolate, stem clasping ; rosette leaves much larger than the cauline ones. Flowers pale pink, in distant, lax racemes. Corolla tube long, linear. Capsules about 10×6 mm., ovoid.

A new record from Delhi State. An introduced weed from Mexico and West Indies. It has become naturalized along roadsides, canal banks, moist waste situations and cultivable ground. Common at Okhla and near the Jamuna Bridge.

Local name : Jangli tambaku

Flowers : April-June. Fruits : May-June

J. K. Maheshwari 97, Roshanara Gardens

N. tabacum Linn. Sp. Pl. 180, 1753 ; FBI. 4 : 245 ; Duthie & Fuller, op. cit. 69, t. 16 ; Santapau in RBSI. 16(1) : 199, 1953.

An erect, large, viscid annual. Lower leaves large, oblong or ovate-

lanceolate; upper ones smaller, amplexicaul, obovate. Flowers rosy or reddish, in terminal panicles. Capsules ovate.

Cultivated for its leaves and sometimes in gardens for its ornamental flowers.

Local name : Tambaku

Flowers : Nov.-March

J. K. Maheshwari 1349

Datura Linn.

For nomenclatural problems and correct identity of some of the *Daturas* of India, see Safford [in Jour. Wash. Acad. Sci. 11 (8) : 173-189, ff. 1-3, 1921; in Jour. Hered. 12 : 178-190, ff. 10-16, 1921 and in Ann. Rep. Smith. Inst. 1920 : 537-567, ff. 1-13, Pl. 1-13, 1922] and Santapau in JBNHS. 47(4) : 652-662, 1948.

Glabrous or subglabrous plants; corolla 5-toothed; fruits tuberculate or armed with short spines *D. metel*

Pubescent plants; corolla 10-toothed; fruits armed with long, weak spines *D. innoxia*

D. metel Linn. Sp. Pl. 179, 1753; Santapau, op. cit. 657.

D. fastuosa Linn. Syst. 2 : 932, 1759; FBI. 4 : 242; Wt. Ic. t. 1396.

D. alba Nees in TLS. 17 : 73, 1834; Wt. Ic. t. 852.

D. fastuosa var. *alba* Cl. in FBI. 4 : 243, 1883.

D. alba Rumph. Herb. Amb. 5 : 242, t. 87, 1755.

A shrub-like herb with dichotomous branches, 0.6-1.2 m. high. Older branches marked with scars of fallen leaves. Leaves ovate, sinuate, unequal sided at the base. Flowers large, funnel-shaped, white, dirty whitish, violaceous, reddish-purple or purple on the outside and white within. Calyx base persistent, reflexed. Capsules globose, prickled, on a short, curved stalk becoming inclined or nodding, opening irregularly. Seeds light brown.

Found in waste places and gardens.

Local name : Dhatura

Flowers : Nov.-Jan. Fruits : Jan.-April

J. K. Maheshwari 1371

D. innoxia Mill.* Gard. Dict. n. 5, 1768; Santapau in JBNHS. 47(4) : 659, 1948 & in RBSL. 16(1) : 198, 1953.

D. metel Sims in Bot. Mag. t. 1440, 1812; FBI. 4 : 243 (non Linn.).

A short, stout shrub with grey tomentum. Leaves ovate-lanceolate to broad ovate, unequal at the base. Calyx reflexed in fruit. Corolla white. Capsules globose, clothed with sharp spines.

*This is an American plant, introduced into India and mentioned in Indian floras under the wrong name of *Datura metel* Linn.

Common near graveyards and open waste places. The leaves are used in medicine, for relieving pains.

Local name : Dhatura

Flowers and Fruits : Nov.-Jan.

J. K. Maheshwari 563, Shahdara

Solanum Linn.

Small trees *S. grandiflorum*

Herbs, undershrubs or shrubs :

Plants unarmed :

Roots with tubers *S. tuberosum*

Roots without tubers ; flowers white *S. nigrum*

Plants armed with prickles (except *S. melongena*, which may be armed or not) :

Prostrate or ascending herbs with long, straight prickles *S. surattense*

Erect shrubs or undershrubs or herbaceous (in *S. melongena*) :

Flowers violet or purple, 2.5 cm. or more across :

Berries globose, yellow turning to black ; calyx usually prickly *S. indicum*

Berries round, oval or elongate-cylindric ; calyx not prickly ; cultigens *S. melongena*

Flowers white, less than 2.5 cm. across ; undershrubs or shrubs ; leaves without prickles *S. torvum*

S. grandiflorum Ruiz & Pav.* Fl. Peruv. 2 : 35, t. 168, 1799 ; Blatt. & Mill. Beaut. Ind. Tr. 134, t. 28.

S. wrightii Benth. Fl. Hongk. 243, 1861.

A small, sparsely thorny tree, about 6 m. tall, branching near the ground. Stems grey-white with longitudinal wrinkles. Leaves fleshy, 8-23 x 6-12 cm., tomentose, rough, deep sinuate or lobed, prickly along veins and often on lower surface. Flowers deep violet, in extra-axillary cymes.

Introduced. Planted in the hedges of gardens. The ants often eat away the flowers and no fruits could be observed.

Flowers : July-Aug.

J. K. Maheshwari 1128

S. tuberosum Linn. Sp. Pl. 185, 1753 ; FBI. 4 : 229 ; Du Roi & Fuller. op. cit. 3 : 15 ; Santapau in RBSI. 16(1) : 196, 1953.

A herb 0.3 to 1 m. tall, with underground, stem tubers. Leaves odd-pinnate with 3-4 pairs of entire leaflets. Flowers white to bluish, in forking clusters.

*The tree is erroneously known in India as *S. macranthum* Dunal (see Blatt. & Mill. loc. cit.).

Cultivated during the cold season for its edible, underground tubers. Cultivar 'Gola' of Meerut and 'Phulwa' of Farrukhabad are commonly grown in Delhi. The former is earlier but the latter is a very heavy yielder. Two crops can be sown, one in September or earlier and the other in January or earlier, so that the tubers are available in December and April.

Local name : Alu ; English name : Potato

Flowers : Jan.-March

J. K. Maheshwari 1379

S. nigrum Linn. Sp. Pl. 186, 1753 ; FBI. 4 : 229 ; Merr. Enum. 3 : 427 ; FUGP. 2 : 124 ; Santapau in RBSI. 16(1) : 195, 1953.

S. rubrum Mill. Gard. Dict. n. 4, 1768.

An erect, diffuse, much-branched, shrubby herb. Leaves 4-8 x 2.5-4 cm., ovate, sinuate or lobed, dark green. Flowers white, small, in drooping, subumbellate, extra-axillary cymes. Berries about 8 x 8 mm., red or black, smooth, polished. Seeds yellow.

A very common weed in cultivated and fallow fields as well as in the shady places of gardens. Also found in the crevices of walls and floors of ancient buildings. Used for inflammations. The black fruits taste better than the red ones.

Local name : Makoi ; Chirmothi ; Makoh

Flowers : Cold and summer seasons. Fruits : June-Aug.

J. K. Maheshwari 130, Sarai Rohilla Gardens

S. surattense Burm. f. Fl. Ind. 57, 1768 (excl. syn. Pluk. & Raj.) ; Santapau in RBSI. 16(1), (ed. 2) 154, 1960.

S. xanthocarpum Schrad. & Wendl. Sert. Hanov. 1 : 8, t. 2, 1795 ; FBI. 4 : 236.

A very prickly, deep-rooted, prostrate or ascendingly spreading undershrub. Prickles numerous, large, yellow. Leaves 5-10 x 3.5-8 cm., ovate or elliptic, pinnately lobed. Flowers bluish-purple, few, in extra-axillary cymes. Berries 1.5-2 x 1.2-2 cm., globose, yellow. Seeds smooth.

Grows commonly in waste places, on saline grounds and along roadsides. Also found as a weed in cultivated grounds. The crushed fruits are applied on sores. White-flowered form occurs rarely in the area.

Local name : Berkateli

Flowers : June-Sept. ; March

J. K. Maheshwari 22 ; 115, Najafgarh

S. indicum Linn. Sp. Pl. 187, 1753, in part ; Wt. Ic. t. 346 ; FBI. 4 : 234 ; FUGP. 2 : 125 ; Parker, For. Fl. 367 ; Santapau in RBSI. 16(1) : 196, 1953.

An erect or diffuse, thorny, woolly-tomentose undershrub, 1.2-1.5 m.

tall. Thorns broad-based, straight or hooked. Leaves $5-8 \times 2.5-5$ cm., ovate, subentire or sinuate, usually thorny along the midrib. Flowers bluish-purple or violet, in extra-axillary cymes, subreflexed. Berries about 2.5×2 cm., globose, yellow, turning to black.

Uncommon. Found in waste, dry places near fields and canals. During the hot, dry months, the leaves become much smaller and the plant gives a scrubby, xerophytic appearance. The seeds are said to be poisonous.

Local name : Kateli ; Kanto ka sarpatha ; Baingankateri ; Bhata-kateri

Flowers : July. Fruits : June

J. K. Maheshwari 1140 ; 1176, Najafgarh Canal Banks

S. melongena Linn. Sp. Pl. 186, 1753 ; FBI. 4 : 235 ; Merr. Enum. 3 : 427 ; Santapau, loc. cit.

S. esculentum Dunal, Hist. Solan. 208, 1813.

An erect or diffuse undershrub, prickly or not. Leaves up to 15×9 cm., ovate, sinuate or lobed, pale beneath, grey-tomentose. Flowers violet or bluish, in extra-axillary cymes. Berries round, oval or elongate-cylindric, deep purple.

Grown as garden vegetable for its edible fruits. Three sowings are made during the year in Delhi State—(1) February, (2) June and (3) October, so that the fruits are available in the market from April to October.

Local name : Baingan ; English name : Brinjal

Flowers : July-Sept. Fruits : April-Feb.

J. K. Maheshwari 355

S. torvum Sw. Prodr. 47, 1788 ; FBI. 4 : 234 ; Haines, Bot. Bih. & Or. 612 ; Santapau in JBNHS. 47(4) : 654, 1948.

S. indicum Linn. Sp. Pl. 187, 1753, in part.

S. stramonifolium Roxb. Fl. Ind. 1 : 572, 1832 (non Jacq.).

An erect, branched shrub up to 3.5 m. tall. Stems, branches and petioles sparsely prickly and woolly-tomentose. Leaves up to 30×18 cm., sinuately lobed, without prickles. Flowers in extra-axillary, dense, short racemes. Berries about 1.5×1.5 cm., globose, much exceeding the unarmed, calyx lobes.

Common in moist, shady places of Sabzimandi and Sarai Rohilla fruit orchards, apparently running wild.

Local name : Ranabaingan ; Bhurat

Flowers and Fruits : Aug.-Dec.

J. K. Maheshwari 1348

Lycopersicon Mill.

For the correct generic name *Lycopersicon* and not *Lycopersicum*,

see Druce in Rep. Bot. Exch. Club Brit. Isles (1913) 433, 1914 and Santapau in JBNHS. 47(4) : 659-660, 1948.

L. esculentum Mill. Gard. Dict. n. 2, 1768 ; Santapau in RBSI. 16(1) : 199, 1953.

Lycopersicum esculentum Mill. ; Cl. in FBI. 4 : 237.

Solanum lycopersicum Linn. Sp. Pl. 185, 1753.

Lycopersicon lycopersicon Britton & Brown, Fl. North Unit. Stat. 3 : 168, 1913, nom. illegit.

An erect herb, with spreading, long hairs on stems. Leaves odd-pinnate, with small leaflets interposed. Leaflets ovate to oblong, acuminate, irregularly toothed. Flowers yellow, decurved. Berries red or yellow, pulpy.

Cultigen but also spontaneous. Grown for its fruits which are available from Oct.-Nov. and March-June. Found as an escape along canal banks, moist waste situations and shady places near gardens.

Local name : Tamatar ; Tomatar ; English name : Tomato

Flowers and Fruits : Cold season

J. K. Maheshwari 1403

Cestrum Linn.

Leaves oblong-ovate or elliptic ; corolla lobes erect . . . *C. nocturnum*

Leaves linear or lanceolate ; corolla lobes spreading . . . *C. parqui*

C. nocturnum Linn. Sp. Pl. 191, 1753 ; Bailey, Man. Cult. Pl. 874 ; Santapau in RBSI. 16(1) : 200, 1953 ; Bor & Raiz. 119, f. 76, Pl. 45, 46.

A diffuse shrub. Leaves up to 10 x 4 cm., thin, oblong-ovate to elliptic, shining, tapering at the ends. Flowers greenish-yellow, in axillary and terminal, umbelliform racemes.

Grown for its flowers which are scented at night and hence its local name.

Local name : Rat ki rani ; English name : Lady of the Night

Flowers : July-Sept.

J. K. Maheshwari 694, Mughal Gardens

C. parqui L'Hérit. Stirp. 73, 1788 ; Bailey, loc. cit.

A glabrous, small shrub. Leaves short-petioled, linear or lanceolate, tapering at the ends. Flowers pale yellow, sessile, in profuse, axillary and terminal umbels. Corolla lobes spreading.

Grown in gardens and lawns for its fragrant blooms.

Local name : Rat ki rani

Flowers : May-Sept.

J. K. Maheshwari 1373, Mughal Gardens

Lycium Linn.

L. europaeum Linn. Sp. Pl. 192, 1753 ; FBI. 4 : 240 ; FUGP. 2 : 129 ; Parker. For. Fl. 370.

An erect or bent, thorny, bushy shrub. Stems white. Branchlets ending in spines. Leaves variable in shape, 1.5-3 x 0.5-0.7 cm., linear-oblong or oblanceolate. Flowers white, solitary, funnel-shaped. Berries subglobose, yellow or red.

Common in the drier, hilly tracts near Mehrauli and other places, on gravelly soils. Also found hanging like *Capparis decidua* Edgew., from the crevices of walls of ancient buildings.

Local name : Chirchitta ; Khatai ; Chirmethi

Flowers and Fruits : Oct.-March

J. K. Maheshwari 269

Capsicum Linn.

For description and figures of the various species and varieties of *Capsicum* cultivated in India, see F. J. Shaw and A. R. Khan on "The Types of *Capsicum*" in Mem. Dept. Agric. Ind. (Bot. Ser.) 16 : 59-82, tt. 2-5, 1929.

C. annum Linn. Sp. Pl. 188, 1753 ; Duthie & Fuller, Field & Gard. Crops 3 : 36.

A shrubby, annual herb. Peduncles solitary. Flowers white, drooping. Berries 5-10 cm. long, much longer than broad, reflexed, red or yellow, mildly pungent.

Cultivated during the rainy season for its useful fruits in the urban areas. The dried fruit is used as an ingredient in curries and other food preparations. The green pods are pickled. In Delhi the village Narela is a famous market for chillies. The following cultivars are grown : Colossal, Spanish Giant, Golden Queen, Ruby King, Bull Rose, Sunny Brook and Pimento.

Local name : Mirch ; English name : Chillies ; Red pepper

Flowers and Fruits : June-Oct.

J. K. Maheshwari 26

73. Scrophulariaceae

Leaves all alternate ; corolla subrotate ; flowers yellow . . . *Verbascum*

Leaves all opposite or the lower only :

Corolla spurred or saccate at the base in front :

Flowers white or pinkish ; corolla saccate in front . . . *Antirrhinum*

Flowers yellow ; corolla spurred in front . . . *Kickxia*

- Corolla not spurred or saccate at the base in front ; capsules opening by valves :
 Corolla tube very long and narrow ; flowers red, in cymes *Russelia*
 Corolla tube not very long ; flowers axillary or racemose, other than red :
 Corolla distinctly 2-lipped :
 Anthers 1-celled ; leaves sessile *Striga*
 Anthers 2-celled ; leaves shortly petioled or sessile :
 Flowers yellow *Lindenbergia*
 Flowers blue, purple, pink or white, never yellow :
 Corolla throat 2-lobed on the palate ; stamens 4 *Mazus*
 Corolla throat not lobed on the palate ; stamens 2 or 4 *Lindernia*
 Corolla not 2-lipped :
 Calyx 5-partite ; upper sepal longer and broader than the others ; semi-aquatic or marshy herbs *Bacopa*
 Calyx 3 to 4-lobed or 4 to 5-partite ; sepals not as above :
 Minute, tufted herbs ; corolla small, lobes subequal *Glossostigma*
 Herbs ; corolla lobes flat, spreading, the two lateral broader *Veronica*

Verbascum Linn.

- Woolly-tomentose herbs ; stamens 5 *V. thapsus*
 Pubescent herbs ; stamens 4 *V. chinense*

V. thapsus Linn. Sp. Pl. 177, 1753 ; FBI. 4 : 250 ; FUGP. 2 : 138 ; Pennell. Scroph. West. Himal. 40.

An erect, woolly-tomentose herb, resembling a tobacco when vegetative. Stems winged with the prolonged leaf bases. Radical leaves large. Flowers yellow, much crowded, in terminal, woolly, long spikes appearing cylindrical. Capsules ovoid, tomentose, about 8 × 6 mm. Seeds about 0.5 × 0.25 mm.

Occurs along canal banks in cultivated fields and along the borders of fields ; collected from Todapur, near I.A.R.I.

Flowers and Fruits : Jan.-April
 J. K. Maheshwari 1412, Todapur

V. chinense (Linn.) Santapau, Fl. Purandhar 90, 1957.

Scrophularia chinensis Linn. Mant. 250, 1771.

Celsia coromandeliana Vahl, Symb. Bot. 3 : 79, 1794 ; FBI. 4 : 251.

An erect, pubescent annual, branched or unbranched from the base. Radical leaves rosette-forming, lyrato-pinnatifid ; cauline ones smaller,

passing into floral bracts. Flowers yellow, in simple or branched, terminal, 30-60 cm. long racemes. Capsules 7×5 mm., subglobose, glabrous, pale brown.

Common in moist, shady places along the slopes of Jamuna Banks, Najafgarh Drain and similar situations in Jamuna-Khadar area. An attractive herb when in full bloom.

Local name : Dangra ka tamaku

Flowers and Fruits : Summer and rainy seasons

J. K. Maheshwari 263 ; 352, Hauz Khas

Antirrhinum Linn.

A. orontium Linn. Sp. Pl. 617, 1753 ; FBI. 4 : 253 ; FUGP. 2 : 140.

An erect or somewhat wavy, slender herb, 15-45 cm. high. Stems glandular. Leaves $2.5-5 \times 0.2-0.3$ cm., linear, narrow, entire. Corolla bilipped, gibbous at base. Flowers white or pinkish, solitary, axillary. Capsules pubescent, obliquely ovoid, about 10×5 mm. Seeds about 1×0.3 mm.

Common in the corn fields during winter and early summer months and can be recognized at once by its characteristic capsules.

Flowers and Fruits : Feb.-April

J. K. Maheshwari 925, Azadpur Road, in the fields of *Trigonella foenum-graecum*

Kickxia Dumort.

K. ramosissima (Wall.) Janchen in Oesterr. Bot. Zeitschr. 82 : 152, 1933 ; Pennell, op. cit. 59 ; Santapau in JBNHS. 49 : 27, 1950.

Linaria ramosissima Wall. Pl. As. Rar. 2 : 43, t. 153, 1831 ; FBI. 4 : 251 ; FUGP. 2 : 140.

A slender, glabrous, much-branched herb, up to 60 cm. in length. Lower leaves opposite, upper alternate, variable in shape, round-ovate to triangular-hastate. Flowers yellow, solitary, axillary, passing into long, terminal racemes, spurred. Capsules globose, pale brown. Seeds echinulate.

The plant is interesting for its special habitat. Occurs commonly in the crevices and fissures of ancient fort walls, from where it hangs downwards. On 23-7-1955, I collected a number of plants (most of them bearing mature fruits) from the fort of Nizamuddin and Humayun's tomb. Another member, *Lindenbergia indica* Kuntze, is also found in similar localities.

Flowers : April-June, Fruits : June-Aug.

J. K. Maheshwari 1123

Russelia Jacq.

Leaves broad ovate, serrate

Leaves linear, lanceolate or ovate; upper ones reduced to scales. *R. coccinea*

R. coccinea

R. equisetiformis

R. coccinea Wettst. in Engl. & Prantl, Nat. Pfam. 4 (3b) : 63, 1891 & in Bull. Herb. Boiss. 2 : 562, 1894.

A garden shrub. Leaves opposite or whorled, broad ovate, serrate. Flowers red, on short-peduncled, many-flowered, close, dichotomous cymes. Corolla tube cylindrical. Stamens 4, included.

Flowers : Nov.-July

J. K. Maheshwari 219, Talkatora Gardens

R. equisetiformis Schlecht. & Cham. in Linnaea 6 : 377, 1831 ; Santapau in JBNHS. 49 : 47, 1950.

R. juncea Zucc. in Flora 15(2) Beibl. 99, 1832; Haines, Bot. Bih. & Or. 620; Bor & Raiz. 227, Pl. 82, 83.

An erect or drooping, beautiful, rush-like, much-branched shrub, resembling an *Equisetum* when vegetative, 1 m. or more in tallness. Stems ribbed. Leaves whorled, linear, lanceolate or ovate; upper ones reduced to scales. Flowers numerous, red or bright scarlet, on 1 to 3-flowered peduncles, borne in great profusion on the drooping branches.

A garden shrub ; grown in the shrubberies and hedges of gardens for its exceedingly beautiful appearance.

Flowers : June-Nov.

J. K. Maheshwari 771

Striga Lour.

S. euphrasioides (Vahl) Benth. in Comp. Bot. Mag. 1: 364, 1835; FBL 4: 209; FUGP. 2: 157; Pennell, op. cit. 97; Santapau in RBSI. 16 (1): 208, 1953.

Buchnera euphrasioides Vahl, Symb. Bot. 3 : 81, 1794 ; Wt. lc.
t. 855.

An erect, strigose herb with simple or branching stems. Leaves linear, scabrous. Flowers white, solitary, axillary, forming interrupted, terminal spikes. Calyx 15-ribbed, scabrous; lobes linear-subulate. Corolla tube exerted. Capsules shorter than calyx.

Grows in grassy places and on drying up areas near canals, ponds and puddles ; often mixed with grasses.

Flowers and Fruits : Cold season

P. P. Sehgal 1111, Shahdara

Lindenbergia Lehm.

L. indica (Linn.) Kuntze, Rev. Gen. 462, 1891; Santapau in JBNHS, 49: 45, 1950.

Dodartia indica Linn. Sp. Pl. 633, 1753.

Lindenbergia urticaefolia Lehm. in Link & Otto Icon. Pl. Rar. Hort. 95, t. 48, 1828; FBI. 4: 262.

An erect or creeping, hairy annual. Leaves $2.5-5 \times 2-3.5$ cm., broad ovate, serrate. Flowers yellow, spotted with red, axillary as well as forming axillary and terminal, spicate racemes. Capsules about 5×3 mm., slightly exserted from the calyx, hairy.

Common in the crevices and amongst stones of ancient monuments, from where it hangs downwards. Grows on dry, gravelly soil.

Flowers and Fruits: Jan.-April

J. K. Maheshwari 740, Lodi Gardens; 829, near Qutab

Mazus Lour.

M. japonicus (Thunb.) Kuntze, Rev. Gen. 462, 1891; Pennell, Scroph. East Temp. N. Amer. 137; Merr. Enum. 3: 432; Santapau in JBNHS. 49: 48, 1950.

Lindernia japonica Thunb. Fl. Jap. 253, 1784.

Mazus rugosus Lour. Fl. Cochinch. 385, 1790.

A small, glabrous or hairy, tufted herb. Leaves mostly radical, $3-8 \times 1-2.5$ cm., obovate-spathulate or oblong, irregularly crenate. Flowers purplish-violet with white, in terminal, lax racemes. Capsules subglobose. Seeds very minute, pale brown.

Common in wet or damp places along banks of Jamuna River, in lawns and similar situations.

Flowers and Fruits: Jan.-March

J. K. Maheshwari 590; 1277

Lindernia All.

Stamens 4 with perfect anthers

Upper two stamens perfect, the lower two reduced to staminodes: *L. crustacea*

Leaves parallel-nerved; staminodes bilobed; capsules ovate or shortly oblong

Leaves penni-nerved; staminodes entire; capsules linear-oblong *L. parviflora*

L. crustacea (Linn.) F. Muell. Cens. Austr. Pl. 97, 1882; Mukerjee in JBS. 24: 130, 1945; Merr. Enum. 3: 437; Santapau in RBSI. 16(1): 203, 1953.

Capraria crustacea Linn. Mant. 87, 1767.

Vandellia crustacea Benth. Scroph. Ind. 35, 1835; FBI. 4: 279; FUGP. 2: 149.

A glabrous, elegant, small herb, branching from the base. Stems angular. Leaves opposite, short-petioled, entire to shallow-toothed. Flowers purplish, axillary and subracemose; lower lip 3-lobed. Capsules equalling the calyx, $3-4 \times 2.5-3$ mm. Seeds rugose.

Common in moist soil of open, grassy lawns and fields during monsoon and post-monsoon period.

Flowers and Fruits: Sept.-Oct.

J. K. Maheshwari 1290, Vallabgarh

L. parviflora (Roxb.) Haines. Bot. Bih. & Or. 635, 1922; Mukerjee, op. cit. 132; Pennell, Scroph. West. Himal. 29.

Gratiola parviflora Roxb. Pl. Cor. 3: 3, t. 203, 1811.

Ilysanthes parviflora (Roxb.) Benth. in DC. Prodr. 10: 419, 1846; FUGP. 2: 151.

A small, erect, glabrous, diffusely branched herb. Leaves ovate-lanceolate to elliptic. Flowers white (or blue in FUGP. loc. cit.), on slender pedicels. Corolla much longer than the calyx. Capsules ovoid-oblong, exceeding the calyx.

A moisture-loving herb, found along the banks of Jamuna River and Najafgarh Drain.

Flowers and Fruits: June-Oct.

J. K. Maheshwari 145; 430

L. ciliata (Colsm.) Pennell in Jour. Arn. Arb. 24: 253, 1943 & Scroph. West. Himal. 32; Mukerjee, op. cit. 133.

Gratiola ciliata Colsm. Prodr. Desc. Grat. 14, 1793.

Bonnaya brachiata Link & Otto. Jour. Pl. Sci. 2: 25, t. 11, 1820; FBI. 4: 284; FUGP. 2: 151.

Vandellia brachiata (Link & Otto) Haines. Bot. Bih. & Or. 632, 1922.

A small, glabrous herb. Stems quadrangular. Leaves oblong, sharply spinose-serrate. Flowers pink or white, in terminal racemes. Capsules linear-oblong.

Found in damp or wet places near canals, ponds, etc.

Flowers and Fruits: Late summer and rainy seasons

Bacopa Aubl. nom. cons.

B. monnieri (Linn.) Pennell in Proc. Acad. Nat. Sci. Philad. 98: 94, 1946; Santapau in RBSI. 16(1): 201, 1953.

Lysimachia monnieri Linn. Cent. Pl. 2: 9, 1756.

Moniera cuneifolia Michx. Fl. Bor.-Amer. 2: 22, 1803 (*Monniera*);

FUGP. 2: 142.

Herpestis monniera Benth. Scroph. Ind. 30, 1835; FBI. 4: 272.

A prostrate herb with spreading or ascending branches, rooting at nodes. Leaves obovate-oblong or spatulate, obtuse, succulent, up to 1.8×0.6 cm. Flowers bluish-purple or white with bluish veins, erect, solitary, short- or long-pedicellate. Capsules ovoid, glabrous, 4.5×3.4 mm.

A semi-aquatic or marshy herb. Common in marshy or wet places near canals, ponds and lakes. On wet, muddy soil near Hindan River, it forms a dense mat of plants, dominating the vegetation. Said to be a nerve tonic and experiments are being conducted in Lady Irwin College, New Delhi, to study the effect of this herb on animal nerves. It is a bitter herb and also used in cure of gonorrheal troubles.

Local name : Neem-jal ; Jal-lep

Flowers : Aug.-Oct. Fruits : Nov.-Dec.

J. K. Maheshwari 316, on way to Okhla ; 562, Azadpur Road ; 1257, Hindan River

Glossostigma Arn. nom. cons.

G. spathulatum (Hook. ex Wt.) Arn. ex Benth. in Comp. Bot. Mag. 2 : 59, 1836 ; FBI. 4 : 288 ; FUGP. 2 : 152 ; Pennell, Scroph. West. Himal. 36 ; Santapau in JBNHS. 49 : 41, 1950.

Microcarpaea spathulata Hook. ex Wt. in Bot. Misc. 2 : 101, Suppl. t. 4, 1831.

A minute, tufted, weak herb, rooting at the nodes. Leaves $2.5-6 \times 2$ mm., narrowly spatulate. Flowers bluish, solitary, very minute. Calyx campanulate, enclosing the capsule.

It is the smallest member of the family in the area ; collected once on Oct. 4, 1953 in moist or wet, sandy-clayey or muddy soils near Najafgarh Drain ; often escapes notice due to its very small size.

Flowers and Fruits : Sept.-Oct.

Veronica Linn.

A prostrate herb ; leaves cordate-ovate or orbicular ; flowers solitary, axillary *V. agrestis*

An erect herb ; leaves oblong or linear-oblong ; flowers in racemes *V. anagallis-aquatica*

V. agrestis Linn. Sp. Pl. 13, 1753 ; FBI. 4 : 294 ; FUGP. 2 : 154.
A pubescent, prostrate or decumbent annual. Leaves ovate-cordate, $1.5-2.5 \times 1-2$ cm., coarsely crenate-serrate. Flowers white, with pinkish tinge, solitary, axillary ; pedicels bent in fruit. Capsules about 3×5 mm., bilobed ; lobes globose.

A common, winter season weed in lawns, cultivated ground, moist, waste situations and recently disturbed soils ; often hidden amongst

grasses and associated with *Anagallis arvensis* Linn. subsp. *arvensis*, *Coronopus didymus* Sm., *Sisymbrium irio* Linn., *Malva parviflora* Linn., and other winter weeds.

Flowers and Fruits : Dec.-March

J. K. Maheshwari 615, University Campus

V. anagallis-aquatica Linn. Sp. Pl. 12, 1753 ; FBI. 4 : 293 ; FUGP. 2 : 154.

An erect, succulent, glabrous herb, 10-50 cm. tall. Stems hollow, creeping and stoloniferous below. Leaves 5-15 x 1.5-2.5 cm., oblong-lanceolate or linear-oblong. Flowers pale purple or white, in lax, axillary racemes. Capsules about 3 x 2.5 mm., orbicular to oblong-orbicular, emarginate.

Common in moist or wet situations in the Jamuna-Khadar area, along the banks of Jamuna River and temporary ponds.

Flowers and Fruits : Feb.-June

J. K. Maheshwari 610, Timarpur

74. Orobanchaceae

Orobanche Linn.

O. aegyptiaca Pers. Syn. 2 : 181, 1806 ; FUGP. 2 : 164.

O. indica Buch.-Ham. ex Roxb. Fl. Ind. 3 : 27, 1832 ; FBI. 4 : 326.

An erect, pale brown, scapigerous root parasite. Scales lanceolate. Flowers blue, many, sessile, in a somewhat lax spike. Bracts ovate, acuminate. Capsules oblong.

Common in the fields, parasitic on the roots of various cultivated plants. Also found as a parasite on the roots of *Ammi majus* Linn. (Umbelliferae), which is grown as a winter ornamental in the University lawns.

Local name : Khumbi

Flowers and Fruits : Jan.-April

J. K. Maheshwari 805 ; 1376, on *Ammi majus* in University Gardens

75. Lentibulariaceae

Utricularia Linn.

Peduncles with a whorl of floats *U. stellaris*

Peduncles without floats *U. flexuosa*

U. stellaris Linn. f. Suppl. 86, 1781 ; FBI. 4 : 328 ; FUGP. 2 : 165.

A rootless, aquatic herb, submerged except the inflorescence. Leaves pinnately divided into capillary segments, each with small bladders at

their bases, often in whorls of 4-5 at the nodes. Flowers yellow or cream-coloured, in aerial racemes. Peduncles kept erect by a whorl of spongy floats. Calyx accrescent. Capsules globose. Seeds minute.

An insectivorous, free-floating aquatic common in the shallow, temporary ponds, puddles and ditches of village Gheora.

Flowers and Fruits : April-June

U. stellaris Linn. f. var. *inflexa* Cl. in FBI. 4 : 329, 1884.

Differs from the type in possessing flowers white with violet streaks. Occurs in the Najafgarh Drain, often associated with other aquatics.

Flowers and Fruits : Sept.-Oct.

U. flexuosa Vahl, Enum. 1 : 198, 1804 ; FBI. 4 : 329 ; FUGP. 2 : 166.

A rootless, free-floating aquatic, submerged except the flowers. Leaves whorled; segments filiform, possessing bladders. Flowers yellow, bracteate, in erect, aerial racemes; peduncles without floats. Capsules subglobose.

Common after the rains in the Najafgarh Drain, associated with other aquatics.

Flowers : Sept.-Nov. Fruits : Dec.-Jan.
J. K. Maheshwari 479

76. Bignoniaceae

Erect trees or shrubs :

Leaves simple *Tecomella*

Leaves compound :

Leaves digitately 3 to 5-foliolate :

Petioles narrowly winged; flowers solitary or clustered on tubercles on the old wood *Parmentiera*

Petioles simple; flowers in terminal clusters on leafless shoots *Tabebuia*

Leaves pinnately compound :

Leaves unipinnate :

Fruits indehiscent, large, woody, gourd-like . . . *Kigelia*

Fruits dehiscent, not as above :

Large shrubs; leaflets toothed; capsules linear *Tecoma*

Trees; leaflets entire; capsules large, cylindric, curved *Haplophragma*

Leaves 2 to 3-pinnate :

Leaflets ovate to ovate-lanceolate, larger; staminodes absent; flowers white with long, slender tube *Millingtonia*

- Leaflets oblong, smaller; staminodes very long; flowers mauve-blue *Jacaranda*
- Climbers and lianas :
- Climbing by tendrils :
- Tendrils tripartite :
- Stamens included; tendrils claw-like or hooked *Bignonia*
- Stamens slightly exerted *Pyrostegia*
- Tendrils simple *Adenocalymna*
- Climbing but not by tendrils :
- Stamens exerted; flowers orange-red *Tecomaria*
- Stamens included; flowers orange or scarlet; plant climbing by aerial rootlets *Campsis*

Tecomella Seem.

T. undulata (Sm.) Seem. in Ann. & Mag. nat. Hist. (ser. 3) 10 : 30, 1862 ; FUGP. 2 : 171 ; Blatt. & Mill. Beaut. Ind. Tr. 139, t. 30.
Bignonia undulata Sm. Exot. Bot. 1 : 35, 1805.
Tecoma undulata G. Don, Gen. Syst. 4 : 223, 1837 ; FBI. 4 : 378.

A large shrub or small tree with drooping branches. Leaves narrowly oblong ; margins undulate. Flowers orange-yellow, conspicuous, in corymbose racemes from short, lateral branches.

Occurs on the Ridge as a crooked, small tree. Also planted in hedges of gardens. Most of the flowers fall off after opening. A very beautiful tree when in full bloom.

Flowers : April-May

J. K. Maheshwari 667, University Campus

Parmentiera DC.

P. cereifera Seem. Bot. Voy. Herald 182, t. 32, 1853 ; Haines, Bot. Bih. & Or. 659 ; Benthall, Trees Calc. 344.

A small, pretty tree. Leaves trifoliate ; petioles narrowly winged. Flowers pretty, whitish or pale pink, on trunk and old branches. Calyx spathaceous.

Native of Panama. Grown in the hedges of gardens.

English name : Candle tree

Flowers : Rainy season

J. K. Maheshwari 1442

Tabebuia Gomez

T. pentaphylla (Linn.) Hemsl. in Biol. Centr. Am. Bot. 2 : 495, 1882.
Bignonia pentaphylla Linn. Sp. Pl. 870, 1762.
Tecoma pentaphylla Juss. Gen. 139, 1789.

A medium-sized tree, branching from near the ground. Leaves digitately compound, 3 to 5-foliolate. Leaflets ovate-oblong, entire, 9-18 × 6-9 cm. Flowers showy, rosy-pink, funnel-shaped, in terminal clusters when the shoots become leafless.

Planted in lawns and squares. A very handsome tree when flowers appear on the leafless shoots. The flowers usually fall off without producing fruits.

Flowers : Dec.-March

J. K. Maheshwari 872, University Campus

Kigelia DC.

K. pinnata DC. Prodr. 9 : 247, 1845 ; Parker, For. Fl. 380 ; Benthall, Trees Calc. 346.

A medium-sized, spreading tree. Leaves ternate, imparipinnate. Leaflets 7-9, oblong or obovate, 7.5-18 × 4-7.5 cm., coriaceous, dark green. Flowers claret-coloured, in lax, hanging racemes. Fruits 30-45 × 12 cm., woody, gourd-like, hanging on cord-like, several cm. long stalks.

Native of Trop. Africa but thrives favourably in Delhi, producing large number of flowers and fruits. Commonly planted along the main streets as a roadside tree. Also planted in gardens and lawns. It provides excellent shade by its dense crown.

Flowers : May-July

J. K. Maheshwari 869, University Campus

Tecoma Juss. emend. H. B. & K.

T. stans (Linn.) H. B. & K. Nov. Gen. & Sp. 3 : 144, 1818 ; Santapau in RBSL. 16(1) : 217, 1953 ; Bor & Raiz. 37, f. 28, Pl. 9, 10.

Bignonia stans Linn. Sp. Pl. 871, 1763.

Stenolobium stans Seem. in Jour. Bot. 1 : 88, 1863.

A shrub or small tree. Leaves 3 to 5-pinnate. Leaflets 4-10 × 3-4 cm., ovate or lanceolate, acuminate, sharply serrate. Flowers bright yellow. Capsules 12-20 × 0.7 cm. Seeds thin-winged.

Commonly planted in the hedges of gardens for its graceful foliage and beautiful blossoms. Also found as an escape in waste, dry places near gardens and houses and on recently disturbed places. Var. *apiifolia* DC., with leaflets having incisions of a pinnatifid to pinnatisect type, sometimes unequally bifoliolate or with bipinnate leaves is also grown in garden hedges.

Flowers : July-Jan. Fruits : Feb.-July

J. K. Maheshwari 52

Haplophragma P. Dop

- H. adenophyllum** (Wall.) P. Dop in Bull. Soc. Bot. France 72 : 890, 1925 ; Steenis, Malay. Bignon. 1006.
Bignonia adenophylla Wall. Cat. 6502, 1832, nom. nud. ; P. Dop in Bull. Soc. Bot. France 72 : 889, 1925.
Heterophragma adenophyllum Seem. ex Benth. & Hook. f. Gen. Pl. 2 : 1047, 1876 ; FBL 4 : 381.

A medium-sized tree with a dense crown. Leaves large, unipinnate. Leaflets 5-7, broad elliptic. Flowers large, yellowish-brown, rusty, woolly-tomentose, in terminal panicles. Capsules cylindric, 30-90 × 3 cm., ribbed, mostly curved. Seeds winged.

Planted as an avenue tree in New Delhi. Also grown in the hedges of gardens. There is a fine avenue of these trees across the entrance gate to the Indian Agricultural Research Institute. Self-sown seedlings are often met in the shade of these trees.

Flowers : Sept.-Nov. Fruits : Oct.-Feb.

J. K. Maheshwari 524, Queensway

Millingtonia Linn. f.

- M. hortensis** Linn. f. Suppl. 291, 1781 ; Parker, For. Fl. 378 ; Steenis, op. cit. 826 ; Blatt. & Mill. Beaut. Ind. Tr. 106, t. 22.

A tall, erect, handsome tree with narrowly pyramidal crown, branching high above the ground. Bark greyish-black, corky. Leaves 2 to 3-pinnate. Leaflets ovate or ovate-lanceolate, acuminate, sinuate or crenate, 2.5-5 × 2-3 cm., deep green above. Flowers white, fragrant, numerous, pendulous, in terminal panicles. Corolla with long slender tube.

Planted in gardens and avenues for the beautiful foliage and silvery sheen of flowers. However, it is not suitable as a roadside tree owing to its tall and straight habit with vertical branches which provide little shade. Some trees have been planted on the Queen Mary Avenue along with tamarinds and *Terminalia arjuna* Wt. & Arn. The fruits are not produced in the area.

Local name : Neem-chameli

Flowers : Nov.-Dec.

J. K. Maheshwari 525

Jacaranda Juss.

- J. mimosifolia** D. Don in Bot. Reg. t. 631, 1822 & Edinb. N. Phil. Jour. 264, 1823 ; Sandwith in Kew Bull. 456, 1953 ; Blatt. & Mill. op. cit. 93, t. 18.

J. ovalifolia R. Br. in Bot. Mag. t. 2327, 1822 ; Merr. Enum. 3 : 444.

J. acutifolia auct. (non Humb. & Bonpl.).

A small or medium-sized, decorative tree with a dense crown, branching high above the ground. Bark grey-white to dull black. Foliage beautiful, mimosa-like, paripinnate. Pinnae 20 pairs or less. Leaflets many, acuminate. Flowers mauve-blue, in lax, pyramidal panicles. Capsules orbicular, hard. Seeds winged.

Native of Brazil and N. W. Argentina. Commonly planted in gardens, lawns and squares. The trees planted on the corners of the two Secretariat buildings make a beautiful sight in April.

Flowers : March-May. Fruits : June-Oct.

J. K. Maheshwari 639, Rashtrapati Bhavan Campus

Bignonia Linn.

B. unguis-cati Linn. Sp. Pl. 623, 1753 ; Bor & Raiz. 32.

A shrub, climbing extensively by its 3-fid, claw-like tendrils, with a pair of glaucous, oblong, acuminate leaflets. Flowers bright yellow, trumpet-shaped. Fruits about 30×1.3 cm., narrowly linear ; valves leathery.

A climber of extraordinary beauty when in flower. Commonly grown in gardens on the trellis and around the trunk of trees where it climbs by its 3-fid, hooked tendrils.

Flowers : Jan.-June

J. K. Maheshwari 670, University Gardens

Pyrostegia Presl

P. venusta (Ker-Gawl.) Miers in Proc. Roy. Hort. Soc. 3 : 188, 1863.

Bignonia venusta Ker-Gawl. in Bot. Reg. 3 : t. 249, 1818 ; Bor & Raiz. 30, t. 23, Pl. 6.

An evergreen, climbing shrub. Leaflets ovate to ovate-oblong, abruptly acuminate, 2-3. Tendrils tripartite. Flowers vermilion-coloured, tubular, in pendulous corymbs. Corolla lobes reflexed.

One of the most beautiful, ornamental climbers. Commonly grown as a creeper along walls, poles and on pergolas. During the winter months, the flowers are produced in such exuberant profusion that it covers the entire surface of plant with a vermilion carpet and hence its common name as 'Golden Shower'. The flowers usually fall off without producing fruits.

Flowers : Jan.-March

J. K. Maheshwari 868, Mughal Gardens

Adenocalymma Mart.

A. nitidum Mart. ex DC. Prodr. 9 : 200, 1845.

An extensively spreading, climbing shrub. Stems grey-white to dull black. Leaves digitately compound, 2 to 3-foliolate. Leaflets ovate, acuminate, entire, leathery, shining. Tendrils leaf-modified, simple. Flowers golden-yellow, scented, large, showy, in axillary, few-flowered racemes. Corolla trumpet-shaped.

Commonly grown in gardens for its large, showy flowers. Grows quickly on trellis and along walls forming a dense screen. The ants are attracted by conspicuous, extra-floral glands on the calyx. The plant is often wrongly known as *Bignonia chamberlaynii* Sims.

Flowers : Summer and rainy seasons
J. K. Maheshwari 647 ; 703

Tecomaria Spach

T. capensis (Thunb.) Spach, Hist. Vég. Phan. 9 : 137, 1840 ; Bailey, Man. Cult. Pl. 908.

Bignonia capensis Thunb, Prodr. Pl. Cap. 105, 1800.

Tecoma capensis Lindl. Bot. Reg. t. 1117, 1828.

A climbing shrub. Leaflets 5-9, broad ovate to ovate, serrate. Flowers orange-red, funnel-shaped, in peduncled, terminal racemes. Corolla bilipped. Stamens exerted.

Grown along the outer walls of gardens for its ornamental flowers.

Flowers and Fruits : Summer and rainy seasons

J. K. Maheshwari, in gardens

Campsis Lour. nom. cons. prop.

Leaflets 9-11, pubescent beneath ; calyx teeth short *C. radicans*

Leaflets 7-9, glabrous beneath ; calyx 5-lobed to the middle

. *C. grandiflora*

C. radicans (Linn.) Seem. in Jour. Bot. 5 : 372, 1867 ; Bailey, op. cit. 903.

Bignonia radicans Linn. Sp. Pl. 624, 1753.

Tecoma radicans Juss. Gen. 139, 1789.

A spreading shrub. Roots arising from the branches. Tendrils absent. Leaflets 9-11, oval to ovate-oblong, 4-6.5 × 2.5-4 cm., acuminate, serrate. Flowers orange-scarlet, in terminal, drooping corymbs. Capsules cylindric-oblong, 7.5-13 × 2.2 cm., beaked. Seeds winged.

Commonly grown in gardens for its large showy flowers, beautiful foliage and climbing habit.

Local name : Latkania

Flowers : April-June

J. K. Maheshwari 669

C. grandiflora K. Schum. in Engl. & Prantl, Nat. Pfam. 4(3b) : 230, 1894 ; Bailey, loc. cit.

Bignonia grandiflora Thunb. Fl. Jap. 253, 1784.

Tecoma grandiflora Loisel. Herb. Amat. 5, t. 286, 1816-27.

A handsome, climbing shrub. Leaflets 7-9, ovate to ovate-lanceolate, serrate. Flowers large, orange-coloured in drooping clusters.

Grown as an ornamental along the outer walls of gardens and along poles and pergolas for its graceful foliage and large flowers during summer months.

Flowers : Summer season

J. K. Maheshwari, cultivated in gardens

77. Pedaliaceae

| | |
|--|------------------|
| Flowers yellow ; fruits drupaceous, 4-spinous | <i>Pedaliium</i> |
| Flowers pink or rosy ; fruits elongate, capsular | <i>Sesamum</i> |

Pedaliium Linn.

P. murex Linn. Syst. 1123, 1759 ; Haines, Bot. Bih. & Or. 661.

A diffuse, much-branched, spreading or ascending, subsucculent herb to undershrub. Root colour that of turmeric. Leaves ovate, distantly crenate. Two dark violet-coloured glands present at base of petioles and pedicels. Flowers yellow. Corolla lobes unequal. Fruits 4-sided, abruptly narrowed at base, with 4, sharp, horizontal spines.

Occurs in damp, sandy soil near Okhla, Najafgarh and in the undulating tracts near Faridabad. Also found in waste places near habitations and graveyards. Occasional on the Ridge. The fruits are medicinal and sold in the market.

Local name : Vilayti gokhru

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 327

Sesamum Linn.

S. indicum Linn. Sp. Pl. 634, 1753 ; FBI. 4 : 387 ; FUGP. 2 : 175 ; Santapau in RBSI. 16(1) : 217, 1953.

An erect, hairy, robust or tall herb, up to 1.8 m. tall. Lower leaves often compound, lobed or deeply divided, broad ovate ; upper ones undivided, linear-oblong. Flowers pink or rosy, bent, solitary, with conspicuous, vesicular glands at base. Capsules erect, oblong, valvular. Seeds black (on the Delhi Ridge) or white.

Common as well as abundant as a naturalized weed on the Ridge during the monsoon months, but the seeds produced are rather hard. Also cultivated for the useful oil yielded from the seeds. The leaves

fall off before the ripening of the fruits. Both the black-seeded and white-seeded varieties are grown in the area.

Local name : Til

Flowers and Fruits : Aug.-Nov.

J. K. Maheshwari 261 : 454, Ridge

78. Martyniaceae

Martynia Linn.

M. annua Linn. Sp. Pl. 618, 1753.

M. diandra Glox, Obs. Bot. 14, t. 1, 1785; Haines, Bot. Bib. & Or. 662.

A tall, rough undershrub. Roots deep yellow. Leaves large, broad ovate, sticky, long-petioled. Flowers rosy, conspicuous, diandrous, drooping, in a lax, terminal, glandular-sticky raceme. Bracts and bracteoles petaloid. Fruits large, hard, black, with two prominent hooks.

Native of Mexico but has become a part of the natural flora. Common during and after rains on the Ridge in depressed areas and along the roadsides passing through the Ridge of Delhi and New Delhi. It is a conspicuous plant and can be easily identified by its glandular-sticky nature, showy, rosy flowers and the strange fruits. A semi-lunar, extra-floral nectary occurs at the base of the pedicel.

Flowers : Aug.-Sept. Fruits : Oct.-Nov.

J. K. Maheshwari 295

79. Acanthaceae

Habit climbing (erect in *Thunbergia erecta* only) ; calyx minute, annular or 10 to 15-toothed *Thunbergia*

Habit erect or prostrate, not climbing :

Scapigerous, stemless herbs ; leaves radical *Elytraria*

Plants with stems and cauline leaves :

Spikes aggregated in radical or subradical globose heads *Lepidagathis*

Inflorescence not as above :

Corolla without an upper lip ; lower lip large, expanded, 3-lobed *Blepharis*

Corolla bilipped or with 5, subequal lobes :

Corolla distinctly or somewhat bilipped :

Inflorescence spinous *Asteracantha*

Inflorescence not spinous :

Corolla tube longer ; plants cultivated :

Flowers bright red, in spicate racemes ; corolla somewhat 2-lipped *Thyrsacanthus*

- Flowers in terminal and axillary thyrses ; corolla strongly 2-lipped *Jacobinia*
- Corolla tube small or shorter :
- Ovules 3-20 in each cell or more :
- Flowers in lax panicles, often in unilateral racemes ; seeds 3-6 in each cell *Andrographis*
- Flowers in dense, terminal spikes ; seeds 10 or more in each cell *Hygrophila*
- Ovules 2-1 in each cell :
- Flowers pink or rose, in trichotomously branched cymes forming panicles *Peristrophe*
- Flowers in dense spikes :
- Bracts with scarious margins, 2- or 4-rowed in secund spikes ; if 4-rowed dimorphic *Rungia*
- Bracts in cylindric or 4-farious spikes, homomorphic :
- Herbs ; anther cells, at least the lower with a basal, spur-like appendage *Justicia*
- Shrubs ; anther cells apiculate, not spurred at base *Adhatoda*
- Corolla lobes 5, subequal :
- Ovules more than 2 in each cell ; capsules 6 or more seeded :
- Flowers in capituliform clusters or contracted cymes *Hemigraphis*
- Flowers larger, solitary or few together or cymose :
- Roots with elongated tubers ; flowers in lax, axillary cymes *Ruellia*
- Roots without tubers ; flowers solitary or in axillary triads or 2-3 superposed *Dipteracanthus*
- Ovules 2 in each cell ; capsules with 4 or fewer seeds :
- Bracts ciliate or ending in a bristle ; flowers yellow, blue-purple or white ; calyx 4-partite *Barleria*
- Bracts not ciliate ; flowers deep blue ; calyx 5-lobed *Eranthemum*
- Thunbergia* Retz. nom. cons.
- An erect undershrub *T. erecta*

Climbers or twiners :

Flowers solitary or paired ; calyx many-toothed
Flowers in racemes ; calyx entire or ringed

- T. erecta* (Benth.) T. Anders. in JLS. 7 : 18, 1864 ; Merr. Enum. 3 : 468 ;
Santapau. Acanth. 10 ; Bor & Raiz. 107, f. 68, Pl. 38, 39.
Meyenia erecta Benth. in Hook. Niger Fl. 476, 1849 & Bot. Mag.
t. 4013, 1857.

A glabrous, much-branched undershrub, 60-90 cm. tall. Leaves
ovate to ovate-lanceolate, entire or repand. Flowers dark blue or purple-
blue. Calyx hidden by foliaceous bracts. Corolla tube curved.
Grown in the hedges and shrubberies of gardens.

Flowers : Dec.-Jan.

J. K. Maheshwari 848, Rashtrapati Bhavan Campus

- T. laevis* Nees in Wall. Pl. As. Rar. 3 : 77, 1832 & in DC. Prodr. 11 :
56, 1847 ; Bremek. in Verh. K. Nederl. Akad. Wet. 11 50 (4) : 51,
1955.

T. fragrans Roxb. var. *laevis* Cl. in FBI. 4 : 391, 1884.

T. fragrans auct. (non Roxb.).

A glabrous climber. Leaves triangular-ovate to lanceolate,
broadened or subcordate, with a single lobe on each side. Flowers
white, solitary, axillary or more. Calyx small, many-toothed. Cap-
sules puberulous, produced into a long beak.

Grown along the trellis and walls.

Flowers and Fruits : Nov.-Feb.

J. K. Maheshwari 855, University Gardens

- T. grandiflora* (Roxb. ex Rottl.) Roxb. Hort. Beng. 45, 1814, nom. nud.
& Fl. Ind. 3 : 34, 1832 ; Wt. Ic. t. 872 ; Santapau, Acanth. 9 ;
Bor & Raiz. 108, Pl. 40.

Flemingia grandiflora Roxb. ex Rottl. in Ges. Naturf. Fr. Neue Schr.
4 : 202, 1803.

A large, woody climber. Leaves thick, fleshy, large, ovate to broad
ovate, deep cordate, toothed or lobed. Flowers light or dark blue,
large and showy. Bracts large.

Grown as an ornamental on wiry meshes of fences ; forms a dense
screen by its foliage.

Flowers : Oct.-Dec.

J. K. Maheshwari 537, University Gardens

Elytraria Michx. nom. cons.

- E. acaulis* (Linn. f.) Lindau in Engl. & Prantl, Nat. Pfam. Nachtr. 1 : 304,
1897 ; Santapau, Acanth. 11.

Justicia acaulis Linn. f. Suppl. 84, 1781; Roxb. Pl. Cor. 2: t. 127.

Tubiflora acaulis Kuntze, Rev. Gen. 500, 1891; FUGP. 2: 180.

A scapigerous, fibrous-rooted herb. Stems almost none. Leaves 23×9 cm., obovate, undulate, tapering below into a short, hairy petiole. Scapes many, usually longer or as long as the leaves. Spikes $2.5-8 \times 0.5-0.7$ cm., simple or branched. Flowers white, pale-coloured, much exceeding the bracts. Bracts ovate, acuminate or spine-tipped. Capsules 6-8 mm. long.

Common on the Ridge and adjacent hilly tracts in open places and shades of bushes on gravelly or stony soil. Grows much better in depressions and shades of shrubs on moist soil. Common in the village Vallabgarh near the canal in open places.

Local name: Patharchatta

Flowers and Fruits: July-Sept.

J. K. Maheshwari 203

Lepidagathis Willd.

L. cristata Willd. Sp. Pl. 3: 409, 1800; Wt. III, t. 164, f. 5 & Ic. t. 455; Santapau, Acanth. 71.

A perennial herb with procumbent branches. Leaves linear or oblong, up to 4.7×1 cm. Spikes aggregated at the base in globose, radical or subradical heads. Flowers white, spotted with brown and purple. Bracts and calyx lobes spinous-mucronate. Capsules 2-seeded.

Rare in Old Delhi Ridge but common on the Ridge of New Delhi in the shade of trees.

Flowers and Fruits: Oct.-April

J. K. Maheshwari 763

Blepharis Juss.

Leaves 4 in a whorl:

Leaves petiolate, thin, acute

Leaves subsessile, thick and fleshy, obtuse

Leaves in opposite pairs

B. maderaspatensis

B. molluginifolia

B. asperrima

B. maderaspatensis (Linn.) Heyne ex Roth, Nov. Pl. Sp. 320, 1821; Bremek. in Verh. K. Nederl. Akad. Wet. II 45(2): 10, 1948; Santapau, Acanth. 15.

Acanthus maderaspatensis Linn. Sp. Pl. 639, 1753.

Blepharis boerhaviaefolia Pers. Syn. 2: 180, 1807; Wt. Ic. t. 458; FBI. 4: 478; FUGP. 2: 183.

A prostrate, spreading or erect, pubescent, much-branched herb. Leaves thin, in whorls of 3-4, unequal, $3-6.5 \times 1.2-2$ cm., ovate, elliptic or obovate, entire or minutely denticulate. Flowers blue or pinkish-purple, solitary or 2-3 together. Bracteoles bristly. Capsules 2-seeded.

Common on the Ridge as well as in the shade of hedges, lawns and open grounds on dry or moist soil.

Flowers and Fruits : Cold season

J. K. Maheshwari 828, Ridge near Birla Mandir

B. molluginifolia Pers. Syn. 2 : 180, 1807; FBI, 4 : 479; FUGP, 2 : 183 ; Santapau, Acanth. 16.

A prostrate, hispid herb. Leaves 1-2.5 x 0.4-0.7 cm., sessile, whorled, fleshy, oblong or obovate. Flowers blue, solitary. Capsules included, ellipsoid.

Common in similar situations as *B. maderaspatensis* Heyne; often hidden amongst grasses.

Flowers and Fruits : Oct.-Feb.

J. K. Maheshwari 754, Lodi Gardens

B. asperrima Nees in DC. Prodr. 11 : 267, 1847; Wt. Ic. t. 1534; FBI, 4 : 478; Santapau, Acanth. 14.

S. K. Mukherjee in JBNHS, 51 (2) : 456, 1953, records this plant from the Ridge of Delhi. I have not come across this species in the area. A small herb. Leaves in opposite pairs in each node, ovate, bigger and broader than *B. molluginifolia* Pers. Flowers bright blue.

Rare.

Flowers : Dec.-Jan.

Asteracantha Nees

A. longifolia (Linn.) Nees in Wall. Pl. As. Rar. 3 : 90, 1832; DC. Prodr. 11 : 247; FUGP, 2 : 184; Santapau, Acanth. 17.

Barleria longifolia Linn. Cent. Pl. 2 : 22, 1756 & Amoen. Acad. 4 : 320.

Ruellia longifolia Roxb. Fl. Ind. 3 : 50, 1832.

Hygrophila spinosa T. Anders. in Thw. Enum. 225, 1860 & in JLS. 7 : 22, 1864; FBI, 4 : 408.

An erect, marshy, hispid, stout herb. Leaves sessile, whorled, lanceolate, the 2 outer ones longer, each with a sharp, straight, yellow spine. Flowers bright blue to bluish-purple, showy, in sessile, axillary whorls. Capsules linear-oblong.

Occurs along banks of fresh or stagnant water ditches and swampy grounds, mixed with marshy grasses and sedges. The spines persist after leaf fall.

Flowers and Fruits : Oct.-Dec.

J. K. Maheshwari 540, canal near Sarai Rohilla

Thyrsacanthus Nees

T. strictus Nees in DC. Prodr. 11 : 324, 1847; Parker, For. Fl. 393.

A glabrous, erect shrub. Leaves elliptic, broadly oblong-ovate to oblong-lanceolate, acuminate, entire or undulate, leathery. Flowers bright crimson, in terminal, spicate racemes, in the axils of bracts. Corolla tube slightly curved and somewhat broadened above.

Grown as an ornamental shrub in the hedges of gardens.

Flowers : March-May

J. K. Maheshwari 655, Rajghat Campus

Jacobinia Moric. nom. cons.

J. tinctoria Hemsl. in Biol. Centr. Am. Bot. 2 : 522, 1882; Parker, For. Fl. 393.

An erect, diffuse shrub. Nodes conspicuously swollen. Leaves ovate or elliptic-lanceolate, acuminate, pale green. Flowers vermilion or deep orange, in terminal and axillary thyrses.

Grown for the beautiful, ornamental flowers.

Flowers : Rainy season

J. K. Maheshwari 353, University Gardens

Andrographis Wall.

Leaves glabrous ; flowers in lax, panicled racemes; capsules glabrous

A. paniculata

Leaves hairy ; flowers in axillary racemes; capsules hairy

A. echioides

A. paniculata (Burm. f.) Wall. ex Nees in Wall. Pl. As. Rar. 3 : 116, 1832; Wt. Ic. t. 518; FBI. 4 : 501 ; FUGP. 2 : 196 ; Santapau, Acanth. 50. *Justicia paniculata* Burm. f. Fl. Ind. 9, 1768.

An erect, glabrous annual, 30-100 cm. tall. Branches sharply 4-angled or winged. Leaves 5-10 × 1.5-2 cm., ovate-lanceolate. Inflorescence a lax, axillary and terminal, unilateral raceme, forming a panicle. Flowers whitish, spotted with rose-purple. Bracts opposite, paired. Capsules tapering at ends.

Spontaneous in moist, shady places. Also cultivated in gardens.

Flowers and Fruits : Oct.-Dec.

J. K. Maheshwari 1114, New Delhi Ridge

A. echioides (Linn.) Nees in Wall. Pl. As. Rar. 3 : 117, 1832; FBI. 4 : 505; FUGP. 2 : 197; Santapau, Acanth. 51.

Justicia echioides Linn. Sp. Pl. 16, 1753; Roxb. Fl. Ind. 1 : 118.

An erect herb, clothed with long, spreading hairs, 25-35 cm. tall. Leaves 4-8 × 1.5-2.5 cm., decussate, ovate-oblong, linear-oblong or subelliptic. Flowers white, spotted with purple, erect, unilateral, candelabrum-like, on horizontal, spreading, axillary racemes. Calyx linear-lanceolate, ciliate. Capsules elliptic-lanceolate, hairy.

Seen on Ridge but not common. Grows preferably amongst reddish sandstones in depressed areas as well as in the crevices of walls.

Flowers and Fruits : Nov.-Dec.

J. K. Maheshwari 1221, New Delhi Ridge

Hygrophila R. Br.

H. polysperma (Roxb.) T. Anders. in JLS. 9 : 456, 1867 ; FBl. 4 : 406; FUGP. 2 : 185; Santapau. Acanth. 19.

Justicia polysperma Roxb. Hort. Beng. 3. 1814. nom. nud. & Fl. Ind. 1 : 119, 1832.

A small, procumbent herb, branching and rooting near the base. Leaves small, oblong to ovate. Flowers minute, white, bilipped, in dense, terminal, oblong spikes. Stamens 2, fertile. Capsules hairy towards the tip. Seeds 20 or more, minute, brown.

Common in drying up places near the temporary ponds of village Gheora.

Flowers and Fruits : March-May

J. K. Maheshwari 1421

Peristrophe Nees

P. bicalyculata (Retz.) Nees in Wall. Pl. As. Rar. 3 : 113, 1832; FBl. 4 : 554 ; FUGP. 2 : 210; Santapau. Acanth. 93.

Dianthera bicalyculata Retz. in Vet. Akad. Handl. 297, t. 9, 1775.

Justicia bicalyculata Vahl, Symb. Bot. 2 : 13, 1791.

An erect, much-branched herb or undershrub, 60 cm. or more in tallness. Stems 6-angled. Leaves 5-10 x 3-4.5 cm., ovate, glabrous above. Flowers pink, in trichotomously branched, lax panicles. Corolla bilipped. Stamens 2. Capsules pointed, narrowed into a stalk.

Common throughout in the shades of trees and hedges; often becoming gregarious. Also common as an undergrowth in the fruit orchards.

Local name : Missi

Flowers and Fruits : Sept.-Dec.

J. K. Maheshwari 426, University Campus

Rungia Nees

Bracts dimorphic; flowers small, bright blue; bracts not conspicuously winged *R. pectinata*

Bracts homomorphic; flowers large, violet; bracts conspicuously winged *R. repens*

R. pectinata (Linn.) Nees in DC. Prodr. 11 : 470, 1847; Wt. Ic. t. 1547; Santapau, Acanth. 77.

Justicia pectinata Linn. Amoen. Acad. 4: 299, 1759.

R. parviflora var. *pectinata* Cl. in. FBI. 4: 550, 1885; FUGP. 2: 212.

R. parviflora var. *muralis* Cl. loc. cit.

A much-branched, procumbent annual. Leaves elliptic or oblong-lanceolate, tapering at ends, 4-7 × 1-2 cm. Flowers very small, bright blue, in one-sided, short spikes. Bracts dimorphic, the barren ones lanceolate, fertile ones orbicular. Lower anther cells tailed. Capsules about 3 × 1 mm., ovoid.

Abundant in moist, shady places as a herbaceous undergrowth in Sabzimandi and Sarai Rohilla Gardens and other similar waste situations.

Flowers and Fruits: Nov.-Jan.

J. K. Maheshwari 1347

R. repens (Linn.) Nees in Wall. Pl. As. Rar. 3: 110, 1832 & in DC. Prodr. 11: 472; Wt. Ic. t. 465; FBI. 4: 549; FUGP. 2: 211; Santapau, Acanth. 78.

Justicia repens Linn. Sp. Pl. 15, 1753.

A spreading, procumbent herb, rooting from the lower nodes. Leaves 3.5 × 1-1.5 cm., lanceolate to oblong-elliptic. Flowers violet or pinkish, in erect, terminal, pretty spikes. Bracts broad elliptic, cuspidate, conspicuously winged. Capsules hairy.

Common in small patches on moist situations near river banks, etc. often mixed with grasses.

Flowers and Fruits: Oct.-Dec.

J. K. Maheshwari 856, banks of Jamuna River

Justicia Linn.

Erect undershrubs; calyx 5-partite

Erect or prostrate herbs; calyx lobes 4:

Leaves linear to linear-lanceolate, nearly sessile; bracts, bracteoles and sepals obtuse at apex

Leaves elliptic, oblong or ovate, petiolate; bracts, bracteoles and sepals acute:

Sepal margins densely ciliate

Sepal margins glabrous

J. gendarussa Burm. f. Fl. Ind. 10, 1768; Santapau Acanth. 91.

Gendarussa vulgaris Nees in Wall. Pl. As. Rar. 3: 104, 1832 & in DC. Prodr. 11: 410; Wt. Ic. t. 468.

An undershrub, 60-120 cm. tall. Leaves lanceolate or linear-lanceolate, glabrous. Flowers white, spotted with purple inside, in spikes from the upper axils, forming a terminal panicle. Bracts narrow, linear.

Cultivated in gardens as a hedge plant.

Flowers: Jan.-May

J. K. Maheshwari 581, Nicholson Gardens; 857

J. quinqueangularis Koen. ex Roxb. Hort. Beng. 80, 1814, nom. nud. & Fl. Ind. 1 : 133, 1832; FBI. 4 : 536; FUGP. 2 : 209; Santapau, Acanth. 89.

Rostellaria quinqueangularis Nees in Wall. Pl. As. Rar. 3 : 101, 1832 & in DC. Prodr. 11 : 375.

A herb, prostrate or ascending from a geniculate base. Stems angular. Leaves linear or linear-lanceolate, glabrous. Flowers rose-coloured, in long, terminal spikes. Bracts linear, obtuse, glabrous. Capsules oblong, pointed, glabrous.

Common in fields and waste places during the monsoon months. Flowers and Fruits : April-Oct.

J. K. Maheshwari 290, Gheora

J. simplex D. Don. Prodr. Fl. Nepal. 118, 1825; FBI. 4 : 539; FUGP. 2 : 210; Santapau, Acanth. 89.

An erect, slender herb. Internodes long, ribbed. Leaves 3.5 × 1.5-2 cm., ovate to elliptic-oblong. Flowers pale purple or whitish, in erect, axillary and terminal spikes. Bracts hairy, nearly equalling the sepals; margins ciliate. Sepal margins densely ciliate. Capsules oblong, hairy at the top.

Common on the Ridge as well as in other parts during the monsoon and winter months. Used as a medicinal plant. The powdered roots are used against snake bite.

Local name : Onga

Flowers and Fruits : Aug.-Dec.

J. K. Maheshwari 326; 345, Hauz Khas

J. diffusa Willd. Sp. Pl. 1 : 87, 1797; FBI. 4 : 538; FUGP. 2 : 209; Santapau, Acanth. 87.

Rostellaria diffusa Nees in Wall. Pl. As. Rar. 3 : 100, 1832.

An erect, much-branched, shallow-rooted herb. Leaves 2.5-5 × 1.2-1.7 cm., ovate to elliptic-lanceolate. Flowers pink or pale purple, in erect, axillary and terminal spikes. Sepals not hairy. Lower anther cells spurred. Capsules oblong, glabrous.

A common weed in the fields of rainy season crops.

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 1266, fields near Hindan River

Adhatoda Nees

A. vasica Nees in Wall. Pl. As. Rar. 3 : 103, 1832 & in DC. Prodr. 11 : 387; FBI. 4 : 540; Parker, For. Fl. 391; Santapau, Acanth. 92.

Justicia adhatoda Linn. Sp. Pl. 15, 1753; Roxb. Fl. Ind. 1 : 126; FUGP. 2 : 207.

A diffuse, branched, evergreen shrub. Internodes short. Leaves up

to 20 × 8 cm., ovate or elliptic-lanceolate, acuminate. Flowers white, with pink or purple stripes, in dense, axillary, peduncled spikes at the ends of branches. Bracts conspicuous. Capsules 2.5 × 0.8 cm. or more, clavate. Seeds suborbicular, rugose.

Common as well as abundant; often gregarious on the Ridge and adjacent hilly tracts where it occurs as a co-dominant shrub with *Capparis sepiaria* Linn. Also planted near habitations and in the hedges of gardens. Children suck out a sweet sap from the flowers. The roots are used in fever. The leaves are held sacred by the people. Used in the cure of cough. Goats do not like this plant.

Local name : Bansa ; Arusa ; Piabansa ; Bekad ; Basuti

Flowers and Fruits : Dec.-April

J. K. Maheshwari 860, Ridge

Hemigraphis Nees

H. hirta T. Anders. in JLS. 9 : 462, 1867 ; FBI. 4 : 422; FUGP. 2 : 191.

Ruellia hirta Vahl, Symb. Bot. 3 : 84, t. 67, 1794 ; Roxb. Fl. Ind. 3 : 46.

A prostrate, densely hairy, much-branched herb with erect branches. Leaves 2-4 × 1.2-2.3 cm., ovate, crenate. Flowers pale violet to purple-pink, ephemeral, 2.2 × 1.3 cm., in few-flowered heads. Corolla tubular-ventricose. Capsules linear, glabrous.

Common in the shades of hedges around fruit orchards, along the slopes of raised embankments, along canal banks and waste places near ditches; often mixed with grasses and in these localities, forming a carpet of its plants.

Flowers and Fruits : April-June

J. K. Maheshwari 1022, Karnal Road

Ruellia Linn. emend. Bremek.

R. tuberosa Linn. Sp. Pl. 635, 1753 ; Bremek. in Verh. K. Nederl. Akad. Wet. II 45(1) : 11, 1948 ; Santapau, Acanth. 23.

An erect herb, 30 cm. or more high, with a number of slender, elongated root tubers. Stems stout, quadrangular. Leaves ascending, oblong, shining, narrowed at the base, entire to subundulate. Flowers blue-violet, paired, in the axils of leaves, ephemeral. Corolla tube abruptly narrowed below. Capsules linear.

Introduced. Native of Trop. America. Grown in gardens. Also spontaneous in hedges and waste places near gardens.

Flowers and Fruits : Rainy season

J. K. Maheshwari 847

Dipteracanthus Nees-emend. Bremek.

After a revision of the genus *Ruellia* by C.E.B. Bremekamp and N.E.

Nannenga-Bremekamp [Verh. K. Nederl. Akad. Wet. 11 45 (1) : 1-39, 1948] the species occurring wild in Delhi State have been assigned to the genus *Dipteracanthus*. The genus *Ruellia sensu stricto* is represented in India only by an introduced American plant—*R. tuberosa*.

Habit prostrate or climbing; ovary and capsule pubescent.

Habit erect or diffuse; ovary and capsule glabrous; *D. prostratus*

Flowers pale purple

Flowers white

D. patulus

D. suffruticosus

D. prostratus (Poir.) Nees in Wall. Pl. As. Rar. 3 : 81, 1832 & DC. Prodr. 11 : 124; Bremek. op. cit. 16; Santapau, Acanth. 24.
Ruellia prostrata Poir. in Lamk. Encycl. 6 : 349, 1804; FBI. 4 : 411.
Dipteracanthus dejectus Nees in Wall. Pl. As. Rar. 3 : 82, 1832.
Ruellia prostrata Poir. var. *dejecta* Cl. in FBI. 4 : 412, 1884; FUGP. 2 : 187.

A diffuse or straggling, stout herb, 15-45 cm. long. Internodes terete below, angular above. Leaves 2.5-7.5 × 1.7-3.5 cm., ovate, elliptic, subcordate, entire, deep green above, pale beneath. Flowers pale violet, solitary or few together. Corolla caducous, tube funnel-shaped above. Capsules 2-2.5 × 0.5 cm., clavate, pointed, pubescent. Seeds glabrate, brown.

Abundant on unused lawns and waste places in Roshanara Gardens; common in other parts in the shade of fence of gardens and neighbouring waste places; often mixed with grasses.

Flowers and Fruits : June-Sept.

J. K. Maheshwari 99; 875

D. patulus (Jacq.) Nees, loc. cit.; Wt. loc. t. 1505; Santapau, Acanth. 24.
Ruellia patula Jacq. Misc. Bot. 2 : 358, 1781; FBI. 4 : 412; FUGP. 2 : 188.

A hoary-pubescent, erect or straggling, much-branched undershrub. Leaves ovate to elliptic, obtuse, hairy. Flowers pale purple, solitary or 2-3 together, cylindric-funnelform. Capsules clavate, glabrous.

Common on the Ridge in depressions and also in other parts of the district.

Flowers and Fruits : Summer and rainy seasons

J. K. Maheshwari 1184

D. suffruticosus (Roxb.) Voigt, Hort. Suburb. Calc. 483, 1845; Santapau in Ind. For. 79 : 322, 1953.

Ruellia suffruticosa Roxb. Fl. Ind. 3 : 53, 1832; FBI. 4 : 413; FUGP. 2 : 188.

An erect, pubescent, straggling undershrub. Internodes long. Leaves elliptic, obovate or oblanceolate, villous with white hairs on both

surfaces especially on the nerves and veins beneath; margins ciliate. Flowers white, solitary, axillary or more. Corolla and style caducous. Capsules glabrous.

Found in some parts of the Ridge, becoming abundant in some patches only.

Flowers and Fruits : Rainy season

Barleria Linn.

Plants armed; flowers orange-yellow

B. prionitis

Plants unarmed; flowers blue-purple or white

B. cristata

B. prionitis Linn. Sp. Pl. 636, 1753; Wt. Ic. t. 452; FBI. 4 : 482; FUGP. 2 : 200; Parker, For. Fl. 382; Santapau, Acanth. 57.

A bushy, prickly undershrub, branching from base. Stems grey-white. Spines 3-4 or more in the axil of leaves, white. Leaves about 10×5 cm., ovate to elliptic, tapering at ends. Flowers orange-yellow, in terminal spikes. Calyx lobes spine-tipped. Capsules black, pointed, larger than calyx.

Occurs on the Ridge in shady, protected areas. Also found in waste places near gardens. Used as a hedge plant. The plant extract is believed to be as bitter as quinine and is used in the cure of whooping cough and tuberculosis.

Local name : Kala bansa ; Piabansa

Flowers : Oct.-March. Fruits : March-June

J. K. Maheshwari 541, Ridge ; 757, Lodi Gardens

B. cristata Linn. Sp. Pl. 636, 1753; FBI. 4 : 488; FUGP. 2 : 201, in part; Merr. Enum. 3 : 479; Santapau, Acanth. 59.

An erect or diffuse undershrub. Leaves elliptic-oblong, abruptly tapering towards the base, glaucous beneath. Flowers blue-purple, in axillary and terminal, crowded, short racemes. Bracteoles shorter than the outer, spinous sepals. Capsules ellipsoid, 4-seeded.

A new record from Delhi State; has become naturalized in shady places of gardens and waste grounds. Also planted in garden hedges for its ornamental flowers and foliage.

Flowers and Fruits : Oct.-Dec.

J. K. Maheshwari 859, Roshanara Gardens

B. cristata Linn. var. *dichotoma* (Roxb.) Prain, Beng. Pl. 812, 1903 ; Santapau, Acanth. 59.

B. dichotoma Roxb. Fl. Ind. 3 : 39, 1832.

Differs from the typical variety by its white flowers.

A new record from the Upper Gangetic Plain. Occurs as common only as the typical variety, in a naturalized state in moist, shady places of gardens and waste places.

Local name : Safed cheeta
 Flowers : Dec.-Jan.
 J. K. Maheshwari 518

Eranthemum Linn.

E. nervosum (Vahl) R.Br. Prodr. 1 : 477, 1810 ; Bremek. in Rec. Trav. Bot. Néerl. 35 : 136, t. 14E, 1938 ; Santapau, Acanth. 35.
Justicia nervosa Vahl, Enum. 1 : 164, 1804 ; Bot. Mag. t. 1358, 1811.
Daedalacanthus nervosus T. Anders. in JLS. 9 : 487, 1867.

An erect, stout shrub, 1.2 m. or more in tallness. Leaves ovate to elliptic, leathery, 25-50 × 6-8.5 cm., prominently pinnate-veined. Flowers deep blue, in axillary and terminal spikes, with appressed, prominently veined, foliar bracts.

Grown as an ornamental in the shrubberies and hedges for its profusion of azure-blue beautiful flowers.

Flowers : Nov.-April
 J. K. Maheshwari 668

Crossandra infundibuliformis (Linn.) Nees in Wall. Pl. As. Rar. 3 : 98, 1832 & in DC. Prodr. 11 : 280 ; Santapau, Acanth. 55.
Justicia infundibuliformis Linn. Sp. Pl. 21, 1753.

Crossandra undulaefolia Salisb. Parad. Lond. t. 12, 1805.
C. axillaris Nees, loc. cit.; Wt. Ic. t. 460.

A small shrub. Leaves ovate or lanceolate, tapering at ends. Flowers orange or orange-scarlet, in linear-oblong spikes with imbricate bracts.
 Grown as an ornamental.

Flowers : April-Nov.
 J. K. Maheshwari 858

80. Verbenaceae

Inflorescence spicate, centripetal, the lowest flowers opening first :

Flowers in short, capitate, ovoid or cylindric spikes; calyx small :

Creeping herbs ; fruits hard, dry *Phyla*

Shrubs or undershrubs; drupes fleshy *Lantana*

Flowers in elongate, lax or dense spikes or racemes :

Habit of liana type; flowers blue or pale violet *Petrea*

Habit upright :

Trees; flowers white, in long, drooping racemes

. *Citharexylum*

Herbs, undershrubs or shrubs :

Flowers sessile, pale white, pinkish or lilac:

Erect or decumbent herbs; calyx not ribbed; pyrenes 4

. *Verbena*

- Much-branched undershrubs; calyx strongly ribbed;
pyrenes 2 *Bouchea*
Flowers pedicellate, in loose, panicle racemes *Duranta*
Inflorescence cymose, centrifugal, the end flower opening first :
Fruits dehiscent, capsule or capsular :
Flowers white with an orange tube, in small heads disposed in
terminal, trichotomous cymes *Nyctanthes*
Flowers pale violet or light mauve, in dense, axillary cymes
forming thyrses *Caryopteris*
Fruits indehiscent, subdrupaceous to drupaceous or a drupe with 1-4
pyrenes :
Flowers actinomorphic; stamens equal :
Flowers white; calyx accrescent and becoming bladdery in
fruit; trees *Tectona*
Flowers pink, rose or red; calyx not enlarging in fruit; shrubs
. *Callicarpa*
Flowers zygomorphic; stamens didynamous :
Leaves digitately compound *Vitex*
Leaves simple :
Drupes with 1, 4-celled pyrene :
Flowers small, white; drupes small *Premna*
Flowers large, yellow; drupes larger *Gmelina*
Drupes with 4 pyrenes or drupels :
Corolla tube slender; drupes exserted, usually succulent
. *Clerodendrum*
Corolla tube widened upwards; drupes dry, included in
red-coloured calyx *Holmskioldia*

Phyla Lour.

P. nodiflora (Linn.) Greene in Pittonia 4 : 46, 1899; Santapau in RBSI.
16(1) : 237, 1953.

Verbena nodiflora Linn. Sp. Pl. 20, 1753.

Lippia nodiflora A. Rich. in Michx. Fl. Bor.-Amer. 2 : 15, 1803 ; FBI.
4 : 563; FUGP. 2 : 217.

A creeping, much-branched, perennial herb, rooting at the nodes.
Leaves 2-3.5 × 1-2 cm., spatulate to obovate, cuneate and entire below,
serrate above. Flowers pale pink, small, sessile, numerous, in dense,
globose, long-peduncled, axillary, 1.3-2.5 × 0.6-1 cm. heads, elongating
later into oblong spikes. Pyrenes 2, dry, 1-seeded, plano-convex.

Common in moist places along canal edges, banks of Jamuna River,
in moist, grassy lawns and other similar situations; often gregarious,
forming a carpet of its own at some places. Very common in the Khadar
tract.

Local name : Bukkan; Bakanbuti ; Jalbuti
 Flowers and Fruits : April-Aug.
 J. K. Maheshwari 95, Roshanara Gardens

Lantana Linn.

Plants armed with recurved prickles; flowers orange-coloured or pink
 plants unarmed; flowers white *L. camara* var. *aculeata*
 *L. indica*

L. camara Linn. var. **aculeata** (Linn.) Moldenke in Torrey 34: 9, 1934.
L. aculeata Linn. Sp. Pl. 627, 1753.
L. camara auct. (non Linn.).

The real *L. camara* Linn. is a spineless shrub; the plant found in the gardens of Delhi is *L. aculeata* Linn. or the var. *aculeata* of Moldenke. A straggling or climbing, aromatic shrub, 1.2-2.4 m. high, with minute prickles on the branches. Leaves 2.5-7.5 x 2.5-5 cm., ovate or ovate-lanceolate, crenate-serrate, scabrid. Flowers vari-coloured, generally orange-coloured or pink, in short, pedunculate, capitate spikes. Bracts much exceeding calyx. Fruits drupaceous, black, shining. Pyrenes 2.

Originally introduced from Trop. America as a garden plant; now common in hedges and lawns of public and private gardens. Though a very troublesome pest in other parts of India, it is not so in Delhi.

Flowers : June-Sept. Fruits : Dec.-Feb.

J. K. Maheshwari 1207, Nicholson Gardens

L. indica Roxb. Hort. Beng. 46, 1814, nom. nud. & Fl. Ind. 3 : 89, 1832; FBI. 4 : 562; FUGP. 2 : 216; Parker, For. Fl. 396.

A woody shrub. Branches 4-angular, long and rambling. Leaves 3-7 x 2.5-4 cm., ternate, unequal, ovate, crenate-serrate, white-pubescent beneath. Flowers pure white, scentless, very slightly pale purple, in axillary, peduncled, close heads or 1.2-2 cm. long spikes, elongating in fruit. Lowest bracts forming involucre. Drupes purple, enclosed in thin, transparent calyx.

Found on the Ridge in the shades of shrubs and also in the hedges of gardens. The children eat the fruit.

Local name : Mewa ka ped; Tulsidal

Flowers and Fruits : Sept.-Dec.

J. K. Maheshwari 498, Najafgarh

Petrea Linn.

P. volubilis Linn. Sp. Pl. 626, 1753; Merr. Enum. 3 : 381; Bor & Raiz. 141, Pl. 54.

A slender, much-branched shrub or liana. Stems ash-coloured, lenticellate. Leaves variable, ovate to elliptic, 8-15 x 5-6 cm., harsh,

rough. Flowers blue or pale violet, star-like, in terminal, long racemes. Calyx petaloid, rigid.

Native of Trop. America. A handsome plant when in flower. Grown in gardens along walls, pergolas and poles for its blossoms borne in elegant, wreath-like clusters.

Flowers : Oct.-April

J. K. Maheshwari 528

Citharexylum Linn.

C. spinosum Linn. Sp. Pl. 625, 1753; Parker. For. Fl. 405.

A small tree. Leaves ovate, elliptic or lanceolate, glossy, tapering at ends, subcoriaceous. Flowers white, fragrant, in long, drooping racemes.

Planted in the lawns of gardens along the side-lanes of New Delhi and in hedges.

English name : Fiddle wood

Flowers : Sept.-Nov.

J. K. Maheshwari 466, Talkatora Gardens

Verbena Linn.

Erect or decumbent herbs; leaves pinnatifidly lobed; flowers pale pink in spikes *V. officinalis*

Prostrate perennials; leaves dissected into linear segments; flowers lilac-purple, in dense heads elongating in fruits *V. bipinnatifida*

V. officinalis Linn. Sp. Pl. 20, 1753; FBI. 4 : 565; FUGP. 2 : 218.

An erect or decumbent, branching herb, 30-100 cm. tall. Young branches with minute, sparse prickles. Leaves 5-10 x 1.5-2.5 cm., variously lobed, scabrous; lower ones pinnatifid or coarsely toothed; upper ones usually deep dentate or tripartite. Flowers pale pink, in dense, bracteate spikes. Pyrenes dry, subcylindric, smooth.

Common along canal banks, near temporary puddles and stagnant water channels.

Flowers and Fruits: April-Oct.

J. K. Maheshwari 429, Najafgarh Canal Banks

V. bipinnatifida Schau. in DC. Prodr. 11 : 553, 1847; Bailey, Man. Cult. Pl. 840.

A prostrate, hirsute, perennial herb with ascending stems. Leaves divided into linear divisions, long-petiolate. Flowers lilac-purple, in dense heads elongating in fruits. Bracts equalling the sepals. Calyx lobes setaceous.

Cultivated in garden beds and along slopes of private roads, forming a thick carpet and beautifying the landscape; often met as an escape in waste places near gardens.

Bouchea Cham. nom. cons.*B. marrubifolia* Schau. in DC. Prodr. 11 : 558, 1847 ; Wt. Ic. t. 1461 ;
FBI. 4 : 564.

An erect, woody, hoary-pubescent, robust herb or undershrub, much-branched from base, 60 cm. or so in tallness. Leaves ovate or round-oblong to oblong, 2-3.5 x 1.5-2 cm., coarsely toothed; serratures depressed leaf-apposed, up to 13 cm. long spikes. Corolla tube narrow; lobes spreading, unequal. Fruits linear-oblong, black, dry.

Uncommon. Occurs in isolated patches on the Old Delhi Ridge close to the Water Reservoir, near Gurukul along railway lines from Delhi to Faridabad and on the bare hill-tops of Anand Parbat.

Flowers and Fruits : Aug.-Dec.
J. K. Maheshwari 1216; 1241

Duranta Linn.*D. repens* Linn. Sp. Pl. 637, 1753 ; Merr. Enum. 3: 38; Bailey, Man. Cult. Pl. 843.*D. plumieri* Jacq. Select. Am. 186, t. 176, 1763.

An erect, evergreen shrub with spinose or spineless branches. Leaves obovate, elliptic or oblong-lanceolate, entire or serrulate, with minute surface glands on the lower surface. Flowers violet, in axillary and terminal racemes, borne in profusion at the ends of branches, pedicelled. Berries small, orange; exocarp fleshy; endocarp stony. Pyrenes 4.

Introduced. Native of S. America and W. Indies. Very commonly planted as a hedge plant around gardens; grows very readily from cuttings.

Flowers and Fruits : Most part of the year
J. K. Maheshwari 17

Nyctanthes Linn.

This genus, so far regarded as a member of the *Oleaceae*, has recently been transferred by H. K. Airy Shaw (in Kew Bull. 272, 1952) to the family *Verbenaceae* under a new subfamily *Nyctanthoideae*. Airy Shaw Stant (in Kew Bull. 273-276, 1952) considers several morphological and anatomical features to differ from those in the *Oleaceae* but in favour of a *Verbenaceous* affinity.

N. arbor-tristis Linn. Sp. Pl. 6, 1753; FBI. 3 : 603 ; FUGP. 2 : 24.

An erect shrub or small tree. Branches 4-angular. Leaves 10-15 x 5-6.5 cm., ovate, acuminate, very scabrous, with unicellular, warty tri-

chomes and glandular hairs. Flowers white with orange colour, fragrant, in small heads disposed in terminal, trichotomous cymes. Capsules $1.3-2 \times 1.2-2$ cm., compressed, orbicular, separating into 2, flat, 1-seeded pyrenes.

Commonly planted in hedges of gardens and temple compounds for its delightfully fragrant blossoms. The flowers open at nightfall and drop off early next morning. They are collected from the ground, made into garlands and used for worship. An orange-coloured dye is also extracted from the corolla tubes.

Local name : Harsinghar

Flowers and Fruits : Sept.-Nov.

J. K. Maheshwari 472, Talkatora Gardens

Caryopteris Bunge

C. wallichiana Schau. in DC. Prodr. 11 : 625, 1847; Brandis, For. Fl. 370; FBI. 4 : 597; FUGP. 2 : 228; Parker, For. Fl. 404.

An erect shrub. Leaves elliptic to lanceolate, acuminate, toothed, cuneate at base. Flowers pale violet, light mauve or white, sweet-scented, in dense, axillary cymes forming thyrses at the ends of branches. Capsules globose, pubescent.

A garden shrub; planted in the hedges of gardens for its profusely produced, sweet-smelling flowers and dense foliage.

Flowers : Jan.-April

J. K. Maheshwari 646, University Campus ; 1386

Tectona Linn. f. nom. cons.

T. grandis Linn. f. Suppl. 151, 1781; Parker, For. Fl. 405; Merr. Enum. 3 : 389; FBI. 4 : 570; FUGP. 2 : 220.

A large, deciduous tree. Leaves large, elliptic or obovate, entire, cuneate at base, tawny-tomentose below. Flowers numerous, rotati-form, only a few fertile, in large, dichoto- or trichotomously branched, terminal panicles. Drupes globose, densely indumentose, enclosed by the inflated calyx.

Some trees have been planted in the compound of Rashtrapati Bhavan, where they flower and fruit abundantly. There is also one tree in the corner of the Square near Kashmere Gate.

Local name : Sagwan

Flowers : Sept.-Oct. Fruits : Dec.

J. K. Maheshwari 582 ; 1168

Callicarpa Linn.

Leaves densely stellate-woolly beneath; corolla glabrous outside or with some hairs *C. macrophylla*

Leaves thinly stellate-pubescent; corolla more or less pubescent outside

C. macrophylla Vahl, Symb. Bot. 3: 13, 1. 53, 1794; FBL 4: 568; FUGP. 2: 219; Parker, For. Fl. 397. *C. longifolia*

An erect shrub up to 3 m. tall. Branches, lower surface of leaves and inflorescences densely stellate-woolly. Leaves up to 22 x 7 cm., ovate, elliptic or ovate-lanceolate, coarsely crenate-serrate. Flowers rose-coloured, crowded, in dense, dichotomous cymes. Drupes white. Cultivated as a hedge plant in gardens.

Flowers: June-Sept.

J. K. Maheshwari 218, Talkatora Gardens

C. longifolia Lamk. Encycl. 1: 563, t. 69, 1785; FBL 4: 570.

An erect, glabrate shrub. Young parts stellate-tomentose. Leaves lanceolate, acuminate, serrulate, tapering at ends, thinly stellate-pubescent beneath. Flowers pink, in dichotomously branched, dense cymes. Drupes globose, white.

Grown as a hedge plant in gardens.

Flowers: Sept.-Nov. Fruits: Jan.-March

J. K. Maheshwari 663, Talkatora Gardens

Vitex Linn.

Flower clusters lax, in a widely spreading panicle; leaflets mostly broader

Flower clusters dense, in a spike-like inflorescence; leaflets lanceolate

V. negundo Linn. Sp. Pl. 638, 1753; FBL 4: 583; FUGP. 2: 224; Merr. Enum. 3: 394; Parker, For. Fl. 394. *V. agnus-castus*

A shrub or small tree. Branchlets quadrangular, densely white-tomentose. Leaflets 3-5, 10-17 x 2.5-4 cm., petiolulate, lanceolate, acuminate, white-tomentose beneath. Flowers lavender to blue, in loose clusters, arranged in a large terminal panicle. Drupes black.

Planted in gardens, lawns and along railway lines. Common in the Bangar tract on raised bunds along the roads. The warmed leaves are applied to painful and rheumatic swellings; the macerated ones are used as cooling medicine on the forehead in headache.

Local name: Sambhalu

Flowers: Major part of the year

J. K. Maheshwari 118; 689

V. agnus-castus Linn. Sp. Pl. 638, 1753; Bailey, Man. Cult. Pl. 843.

A strongly aromatic shrub, woolly-tomentose throughout. Leaves digitate, long-petiolate, velvety. Leaflets 5-7, lanceolate, 4-10 x 0.65-

1.3 cm., entire. Flowers pale purple or violet, in interrupted spikes in groups of several. Stamens exserted. Drupes small, globose, exceeding the calyx, 4-celled.

Grown in shrubberies of parks and gardens.

Flowers : June-Sept.

J. K. Maheshwari 220, Talkatora Gardens

Premna Linn.

P. mucronata Roxb. Hort. Beng. 95, 1814, nom. nud. & Fl. Ind. 3 : 80, 1832; Royle, 111, 299; Brandis, For. Fl. 366; FUGP. 2 : 222; Parker, For. Fl. 399.

P. latifolia var. *mucronata* Cl. in FBI. 4 : 578, 1885.

A large shrub to small or medium-sized tree. Trunk curved. Leaves 7.5-15 × 5-7 cm., subcoriaceous, broad ovate, shortly acuminate, entire or undulate, pubescent along the midrib and nerves, deep green above, pale beneath. Corymbs broad, 5 × 5-8 cm., usually terminating short, leafy branchlets. Flowers greenish-white. Calyx accrescent. Corolla bilipped. Anthers black. Fruits globose, dark purple; endocarp hard, globose, 4-celled.

A few trees and shrubs have been planted on the outskirts of Sarai Rohilla Gardens, growing along the unmetalled road, where they flower and fruit annually.

Flowers and Fruits : July-Sept.

J. K. Maheshwari 1117, near Bagh Peeperwala (Sarai Rohilla)

Gmelina Linn.

Unarmed, small trees ; bracts small

Spinous shrubs ; bracts large, coloured

G. arborea

G. philippensis

G. arborea Roxb. Hort. Beng. 46, 1814, nom. nud. & Pl. Cor. 3 : 42, Pl. 246, 1815; FBI. 4 : 581; FUGP. 2 : 220; Parker, For. Fl. 397.

A small, deciduous tree. Young parts clothed with pale yellow tomentum. Leaves broad ovate, acuminate; base cuneate. Flowers brownish-yellow, in paniculate cymes. Drupes pyriform or obovoid, smooth; endocarp bony.

Planted in the lawns of gardens. Most of the flowers fall off and only a few develop fruits. The tree does not thrive well in the area.

Fruits : March-May

J. K. Maheshwari 1031, Lodi Gardens

G. philippensis Cham. in Linnaea 7 : 109, 1832; Merr. Enum. 3 : 399; Bor. Man. Ind. For. Bot. 302.

G. hystrix Schult. ex Kurz in JASB. 39 : 81, 1870.

A large or medium-sized, straggling, spinous shrub. Branches len-

ticellate. Branchlets spinescent. Leaves 7.5×4 cm., elliptic, cuneate or rhomboid at ends, entire or distantly toothed, glaucous beneath, with surface glands. Flowers yellow in pendulous cymes, easily detachable from pedicels, protected by large, petaloid bracts. Corolla tube curiously inflated above.

Native of Philippine Islands. Planted in the hedges of public and private gardens and parks.

Flowers : April-Aug.

J. K. Maheshwari 653, Rajghat Gardens

Clerodendrum Linn.

Corolla tube less than 5 cm. long :

Flowers white, rarely pink ; cymes axillary and terminal :

Leaves ovate, elliptic to obovate, subfleshy ; flowers in axillary, 3-flowered cymes *C. inerme*

Leaves ovate or rhomboid, thin ; flowers in dichotomous cymes forming a rounded panicle *C. phlomidis*

Flowers not white ; cymes terminal :

Habit erect ; flowers pink, fragrant *C. fragrans*

Habit climbing ; flowers crimson *C. splendens*

Corolla tube more than 5 cm. long ; flowers white *C. indicum*

C. inerme (Linn.) Gaertn. Fruct. 1 : 271, 1788 ; Merr. Enum. 3 : 401 ; Bor & Raiz. 146, f. 92.

Volkameria inermis Linn. Sp. Pl. 637, 1753.

A straggling, subscandent or trailing shrub. Leaves variable, ovate, elliptic, elliptic-oblong to obovate, glabrous, subfleshy. Flowers white with purple-red filaments, in axillary, 3-flowered cymes from uppermost leaves. Corolla tube slender. Drupes pyriform, subtended at base by accrescent calyx.

Commonly cultivated as hedge plant along foot-paths in lawns and gardens. Also grown as a trailing shrub to cover the stony circles and dirty areas of gardens. The leaves are considerably variable in size depending upon the habitat.

Flowers : July-Nov.

J. K. Maheshwari 413 ; 1173 ; 1285

C. phlomidis Linn. f. Suppl. 292, 1781 ; FUGP. 2 : 225 ; Bor & Raiz. 154, f. 98.

A large shrub or small tree. Bark light brown with dull white lenticels. Leaves ovate or subrhomboid, crenate, wavy or entire. Flowers white, in terminal and axillary, dichotomous cymes, forming a rounded panicle. Drupes black, wrinkled ; endocarp crustaceous. Seeds oblong, white.

Occurs on the Ridge forming clumps with *Maytenus senegalensis* Exell, *Grewia tenax* Fiori, and other shrubs. Also planted in the hedges of gardens. The flowers are often attacked by insects, resulting in proliferation of corolla tubes.

Local name : Arni

Flowers : Aug.-Nov.

J. K. Maheshwari 787, Ridge

C. fragrans Vent. Jard. Malm. t. 70, 1804 ; Bailey, Man. Cult. Pl. 845 ; Bor & Raiz. 149, f. 94.

An erect, sweet-smelling shrub or undershrub. Leaves 15×12 cm. or more, broad ovate, coarsely toothed, truncate or cordate, with extrafloral glands at base of lamina. Flowers pink, very fragrant, in terminal, compact, showy corymbs.

Grown as an ornamental in public and private gardens and fruit orchards, for its very fragrant flowers.

Local name : Attardana

Flowers : Sept.-Oct.

J. K. Maheshwari 468, Talkatora Gardens

C. splendens G. Don in Edinb. N. Phil. Jour. 11 : 349, 1824 ; Bailey, Stand. Cycl. Hort. 1 : 800.

A climbing shrub. Leaves oblong-orbicular to suborbicular, entire, coriaceous, dark green above, cordate, acuminate. Flowers crimson, in dense, many-flowered, terminal, showy cymes. Drupes black.

Grown along the trellis and walls of gardens for its gorgeous blossoms and dense screen of foliage.

Flowers : Jan.-Feb. Fruits : March-April

J. K. Maheshwari 1192, University Gardens

C. indicum (Linn.) Kuntze, Rev. Gen. 586, 1891 ; Bailey, Man. Cult. Pl. 845.

Siphonanthus indica Linn. Sp. Pl. 109, 1753.

Clerodendrum siphonanthus R. Br. in Ait. f. Hort. Kew. 4 : 65, 1812 ; Bor & Raiz. 144.

A tall, glabrous shrub, 1.2-1.8 m. high. Stems hollow, ridged. Leaves usually 4-nate, glabrous, $12.5-20 \times 2.5$ cm., narrowly lanceolate, tapering at base, entire, sinuate or lobulate. Panicles lax, terminal, much-elongate. Flowers white. Bracts reddish when young. Calyx accrescent. Corolla narrowly funnel-shaped, tube 8 cm. or more in length. Nutlets 4, in a persistent, enlarged calyx.

Common in the fruit orchards as a shrubby undergrowth. In Gulab Bagh near Sabzimandi, it grows abundantly in some parts beneath the trees.

Flowers : Oct.

J. K. Maheshwari 766, Azadpur Gardens

Holmskioldia Retz.

H. sanguinea Retz, Obs. 6 : 31, 1791 ; Brandis, For. Fl. 370 ; FBL 4 : 596 ; FUGP. 2 : 228 ; Bor & Raiz. 142.

An erect or straggling, woody shrub. Leaves about 10-6 cm., ovate to broad ovate-oblong, acuminate, crenate, truncately cuneate at base. Flowers red-orange or dark vermillion, clustered in axillary, pedicellate cymes. Calyx accrescent, petaloid. Drupes obovoid. A garden shrub ; cultivated in hedges for its showy clusters of flowers.

Flowers : Jan.-March

J. K. Maheshwari 587, Talkatora Gardens

Stachytarpheta jamaicensis (Linn.) Vahl, Enum. 1 : 206, 1804 ; Merr. Enum. 3 : 381.

Verbena jamaicensis Linn. Sp. Pl. 19, 1753.

Stachytarpheta indica Vahl, Enum. 1 : 206, 1804 ; FBL 4 : 564 ; FUGP. 2 : 229.

An erect, glabrous undershrub. Leaves ovate to elliptic, toothed. Flowers blue, pretty, in long, terminal, bracteate spikes. Planted in gardens.

Flowers and Fruits : Aug.-Feb.

J. K. Maheshwari 362

81. Labiatae (Lamiaceae)

Corolla with 4, nearly equal lobes *Mentha*

Corolla obviously bilipped :

Stamens 4, all perfect, declinate ; anther cells confluent ;

Lower lip of corolla not longer than the upper lip ;

Corolla tube short ; lower lip flat ; stigma bifurcated *Ocimum*

Corolla tube long ; lower lip concave ; stigma not bifurcated *Orthosiphon*

Lower lip of corolla longer than the upper lip ; flowers pale purple *Anisochilus*

Stamens erect, spreading or ascending :

Perfect stamens 2 *Salvia*

Perfect stamens 4, didynamous :

Upper pair of stamens with 1-celled anthers ; flowers dark red *Anisomeles*

Anthers all 2-celled :

Calyx mouth oblique, 6 to 10-toothed ; flowers white *Leucas*

Calyx subbilabiate, 5-toothed ; flowers bluish-purple
Nepeta

Mentha Linn.

M. spicata Linn. Sp. Pl. 576, 1753 ; Bailey, Man. Cult. Pl. 863.

M. viridis Linn. Sp. Pl. 804, 1763.

An aromatic, perennial, glabrous, ascending herb. Leaves 4.5 × 2.3 cm., sessile, ovate-lanceolate, sharply serrate. Flowers white, in many-flowered whorls, arranged in 6 × 1 cm. spikes.

Cultivated in gardens and as a field crop in Timarpur during winter months. Used for culinary and medicinal purposes.

Local name : Podina

Flowers and Fruits : May-June

J. K. Maheshwari 105

Ocimum Linn.

Calyx hairy within :

Fruiting calyx 3 mm. long and corolla 6 mm.

O. americanum

Fruiting calyx 6 mm. long and corolla 10-12 mm.

O. basilicum

Calyx glabrous within :

Pedicels as long as or longer than calyx ; bracts not exceeding calyx

O. sanctum

Pedicels shorter than calyx ; bracts longer than calyx

O. gratissimum

O. americanum Linn. Sp. Pl. 833, 1753 (non Jacq.).

O. canum Sims in Bot. Mag. t. 2452, 1824 ; Royle, Ill. 301 ; FBI. 4 : 607 ; FUGP. 2 : 234 ; Mukerjee, Lab. Ind. Emp. 17.

A bushy, much-branched, pubescent herb, woody at the base. Leaves 3.5-5 × 1.5-2.5 cm., elliptic, elliptic-oblong to elliptic-lanceolate, entire or subcrenate. Flowers pale violet or purplish-white, in whorls of 4-6 on an erect, 4-9 cm. long, lax inflorescence ; pedicels recurved. Corolla exserted, up to 6 × 3 mm. Nutlets ellipsoid, black, 1.5 × 1 mm.

Common on the Ridge and the neighbouring hilly tracts during monsoon months on gravelly soil or amongst stones, in open or depressed places ; often becoming gregarious at some spots.

Local name : Bantulsa ; Tulsiband ; Jangli talsa

Flowers and Fruits : July-Nov.

J. K. Maheshwari 255 ; 1081, New Delhi Ridge

O. basilicum Linn. Sp. Pl. 597, 1753 ; FBI. 4 : 608 ; FUGP. 2 : 235 ; Mukerjee, op. cit. 18.

An erect, herbaceous plant, 0.6-1 m. tall. Leaves ovate-lanceolate, entire or toothed. Flowers whitish-pink or purplish, in whorls on simple or branched racemes. Nutlets black, pitted.

Cultivated in gardens. The plant is strongly aromatic and is much used as a flavouring agent.

Local name : Marua; Niyazho

Flowers and Fruits : Major part of the year

J. K. Maheshwari 1295, Vallabgarh

O. sanctum Linn. Mant. 1 : 85, 1767; FBl. 4 : 609; FUGP. 2 : 233; Merr. Enum. 3 : 422; Mukerjee, op. cit. 19.

A much-branched, woody herb, often purplish in colour. Leaves 3-4.5 x 1.5-2 cm., ovate, elliptic-oblong to oblong, entire or crenate-serrate, hairy, minutely dotted. Flowers purplish-pink, whorled, in racemes, often forming panicles. Bracts broad ovate, acuminate, not exceeding calyx. Nutlets broad ellipsoid, smooth, 1.5 x 1 mm.

Commonly cultivated in the courtyards of bungalows and private gardens, often as a pot plant. All parts of the plant are used medicinally.

Local name : Tulsi

Flowers : Nov.-Feb.

J. K. Maheshwari 1352

O. gratissimum Linn. Sp. Pl. 1197, 1753; FBl. 4 : 608; FUGP. 2 : 234; Mukerjee, op. cit. 20.

An erect, much-branched shrub. Young parts pubescent. Leaves 5-10 x 3-6 cm., elliptic-lanceolate, crenate-serrate, tapering at ends, cuneate. Flowers small, clustered in short, simple or branched racemes. Bracts broad ovate, acuminate, longer than the calyx. Nutlets subglobose, brown.

Cultivated in gardens.

Flowers : Oct.-Dec.

J. K. Maheshwari 772, Rashtrapati Bhavan Compound

Orthosiphon Benth.

O. pallidus Royle ex Benth. in Hook. Bot. Misc. 3 : 370, 1833; FBl. 4 : 613; FUGP. 2 : 236.

An erect, diffuse herb, 15 cm. or more in tallness. Leaves 3-7 x 1.3-3 cm., ovate, crenate, petiolate, glabrous, greenish-yellow. Flowers 9 x 4 mm., white, in lax, erect verticillasters, arranged in a raceme. Calyx enlarging in fruit, deflexed in fruit. Nutlets subglobose.

Rare. Some plants occur in the lower sandy or gravelly beds, along the railway lines near Gurukul, from Delhi to Faridabad.

Flowers and Fruits : July-Sept.

J. K. Maheshwari 1235

Anisochilus Wall.

A. carnosus Wall. Pl. As. Rar. 2 : 18, 1831 ; Royle, 111. 301 ; FBI. 4 : 627 ; FUGP. 2 : 240 ; Mukerjee, op. cit. 58.

Royle (loc. cit.) records this species from Delhi to Allahabad along the banks of Jamuna. I have not come across the plant.

An erect annual, 30-60 cm. high. Stems glabrous or sparsely pubescent, often tinged with red. Leaves rather fleshy, $3-6 \times 2-5$ cm., broad ovate, obtuse, crenate. Flowers pale purple, in 1.3-4 cm. long spikes. Nutlets suborbicular, compressed, polished, brown.

Local name : Panjiri

Salvia Linn.

Small shrubs or undershrubs ; leaf blades usually 0.5-2 cm. long :

Calyx with gland-tipped hairs ; corolla annulate within .

Calyx with very long, eglandular hairs ; corolla exannulate .

Herbs ; leaf blades usually much exceeding 2 cm.

S. aegyptiaca Linn. Sp. Pl. 23, 1753 ; FBI. 4 : 656 ; FUGP. 2 : 256 ; Mukerjee, op. cit. 107.

A low, much-branched herb, up to 20 cm. high. Branches spreading, hairy or scabrid. Leaves tufted, $3-6.3 \times 0.5-1$ cm., linear-lanceolate, tapering at ends, dentate. Flowers bluish or white dotted with blue, in distant whorls of 2-6 arranged in erect or ascending racemes. Calyx hairy. Nutlets oblong-ellipsoid, black.

Occurs in the neighbourhood of Delhi.

S. santolinaefolia Boiss. Diagn. Pl. Orien. (sér. 1) 13, 1859 & Fl. Oriens. 4 : 632 ; FBI. 4 : 656 ; Mukerjee, op. cit. 108.

S. aegyptiaca Linn. var. *pumila* Hook. f. in FBI. 4 : 656, 1885 ; FUGP. 2 : 256.

Differs from the preceding one in being more scabrous and villous. Leaves very rigid and rugose. Calyx longer, villous with long hairs.

Common on the Ridge as well as in the hilly tracts near Mehrauli and Faridabad on dry, gravelly soil or in the crevices of stones. The plant extract is used for gonorrheal troubles.

Local name : Gulab-kosh

Flowers and Fruits : July-Oct.

J. K. Maheshwari 1082

S. plebeia R. Br. Prodr. 501, 1810 ; Merr. Enum. 3 : 413 ; Mukerjee, op. cit. 111.

An erect, deep-rooted annual, 90-120 cm. tall. Stems stout, branched, 4-angular, grooved. Leaves $2.5-7.5 \times 2-4$ cm., oblong-lanceo-

late, crenate. Flowers bluish-white, small, in panicles, usually compact, spicate racemes. Bracts reflexed. Calyx 4×3 mm., accrescent. Nutlets minute, ovoid, brown.
Common in moist localities along the banks of Jamuna River and irrigation channels in the suburbs.
Flowers and Fruits : Winter and summer seasons
J. K. Maheshwari 844 ; 1084

Anisomeles R. Br.

A. indica (Linn.) Kuntze, Rev. Gen. 512, 1891 ; Mukerjee, Lab. Ind. Emp. 152.
Nepeta indica Linn. Sp. Pl. 571, 1753.
Anisomeles ovata R. Br. in Ait. f. Hort. Kew. 3 : 364, 1811 ; FUGP. 2 : 245.

An erect, woody herb to undershrub, 1-2 m. high, branching from the base. Stems shortly 4-winged, woolly-hairy. Leaves $5-10 \times 3.5-7$ cm., ovate, cordate, crenate-serrate, scaberulous. Flowers 20×6 mm., dark red, in many-flowered, axillary whorls forming a dense, interrupted, spicate inflorescence. Calyx accrescent. Nutlets black, smooth, polished.

Common on moist soils of fruit gardens as a shrubby undergrowth or along the slopes of canal banks. Sometimes it establishes contacts with its stems on *Capparis septuaria* Linn. and other shrubs and then it becomes climbing in habit. The plant is medicinal and also used as fodder.

Local name : Parpata ; Kala bhangra ; Kala cheeta
Flowers : June-Oct.

J. K. Maheshwari 104, Roshanara Gardens ; 1297

Leucas R. Br.

Flowers in large, subglobose, terminal whorls only

Flowers in both axillary and terminal whorls ; *L. cephalotes*

Calyx mouth split above ; lower lip much prolonged *L. urticaefolia*

Calyx mouth not split, projecting forward above *L. aspera*

L. cephalotes Spreng. Syst. 2 : 743, 1825 ; FBI. 4 : 689 ; FUGP. 2 : 251 ; Mukerjee, op. cit. 168.

An erect, robust, pubescent annual, 30-100 cm. tall. Stems and branches obtusely angular. Leaves $5-8 \times 2-3.5$ cm., ovate or ovate-lanceolate, crenate-serrate. Flowers white, in large, dense, globose, terminal whorls. Bracts many, foliar. Calyx mouth oblique, hairy within. Nutlets dark brown, smooth.

Common along the borders as well as in the fields of winter season crops.

Local name : Gubbha

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 330; 395; 1307

L. urticaefolia R. Br. Prodr. 504, 1810; FBI. 4 : 680; FUGP. 2 : 249; Mukerjee, op. cit. 166.

An erect or diffuse, hairy herb. Leaves $4-6 \times 1.5-3.5$ cm., ovate, coarsely toothed. Flowers white, in dense, globose whorls. Bracts linear or subulate-lanceolate, ciliate. Calyx mouth very oblique. Nutlets obovoid-oblong, trigonous, brown.

Common in and along the edges of cultivated fields in villages.

Local name : Goma; Gumma

L. aspera (Willd.) Spreng. Syst. 2 : 743, 1825; FBI. 4 : 690; FUGP. 2 : 250; Merr. Enum. 3 : 410; Mukerjee, op. cit. 166.

Phlomis aspera Willd. in Link, Enum. Pl. Hort. Berol. 2 : 621, 1822.

An erect or diffuse, much-branched herb, hairy throughout. Leaves elliptic-linear, subentire to crenate. Flowers white, in terminal and axillary, up to 2.5 cm. across whorls. Bracts linear, filiform, ciliate. Nutlets oblong, smooth, brown.

Common in fallow and cultivated fields.

Local name : Gopha

Flowers and Fruits : Aug.-Feb.

J. K. Maheshwari 830

Nepeta Linn.

N. hindostana (Roth) Haines, Bot. Bih. & Or. 744, 1922; Mukerjee, op. cit. 133.

Glechoma hindostana Roth, Nov. Pl. Sp. 258, 1821.

Nepeta ruderalis Buch.-Ham. ex Hook. f. in FBI. 4 : 661, 1885 ; FUGP. 2 : 254.

A hairy herb, with several branches from the base. Branches 4-angular, grooved. Leaves $2-3.5 \times 1.5-2.5$ cm., ovate, broad ovate to suborbicular, coarsely crenate-serrate. Flowers $5-7 \times 2-3$ mm., bluish-purple, in stalked, axillary, dense cymes forming dense, spiciform thyrses at the top. Nutlets oblong, brown with white dots.

Rare. Found in the marshy places near Shahdara.

Flowers : June-Aug.

J. K. Maheshwari 1228, Shahdara

82. Plantaginaceae

Plantago Linn.

Leaves narrow, linear, finely acuminate; plants cultivated

P. ovata

Leaves broad, ovate to oblong-ovate, obtuse or subacute

P. major

P. ovata Forsk. Fl. Aegypt.-Arab. 31, 1775; FBI. 4 : 707; FUGP. 2 : 262; Duthie & Fuller, Field & Gard. Crops 3 : 53, t. 92.

P. ispaghula Roxb. Fl. Ind. 1 : 404, 1832.

An erect, almost stemless annual. Leaves 10-25 x 1 cm., woolly-hairy, linear, acuminate. Scapes straight, erect. Flowers in 1.5-4.5 x 0.8-1 cm., cylindric or ovoid spikes. Bracts winged. Capsules 2-seeded.

Cultivated for the seeds, the mucilage of which is used in local medicines for dysentery and disorders of the digestive system.

Local name : Isaphgol

Flowers and Fruits : Jan.-March

J. K. Maheshwari 934

P. major Linn. Sp. Pl. 112, 1753; FBI. 4 : 705; FUGP. 2 : 61; Merr. Enum. 3 : 491.

A perennial, stout, glabrous herb. Leaves radical, 8-25 x 4-7 cm., ovate or oblong-ovate, entire or sinuate-toothed, decurrent; petioles sheathing. Flowers crowded in long, slender, cylindric spikes, 8-20 x 0.8 cm. or more. Corolla lobes reflexed. Capsules 4-5 x 2-3 mm., ovate, glabrous, circumsciss. Seeds dull black.

Uncommon. Occurs near canal banks or moist places in Roshanara, Azadpur and Sabzimandi Gardens.

Flowers and Fruits : Major part of the year

J. K. Maheshwari 124, 21-Bigah Bagh (Azadpur)

83. Nyctaginaceae

Scandent or straggling, thorny shrubs; bracts large, coloured . . . *Bougainvillea*

Erect, straggling or subscandent herbs; bracts not coloured :

Flowers showy, in a calyx-like involucre . . . *Mirabilis*

Flowers small, in heads of umbels; bracts minute . . . *Boerhavia*

Bougainvillea Comm. ex Juss. corr. Spach nom. cons.

Perianth tube densely pubescent ; leaves and stems pubescent

B. spectabilis

Perianth tube more or less puberulent; leaves and stems
subglabrous

B. glabra

B. spectabilis Willd. Sp. Pl. 2 : 348, 1799 (*Buginvillaea*); Merr. Enum. 2 : 133; Bailey, Man. Cult. Pl. 358.

A woody, scandent or straggling shrub, climbing by the help of thorns. Leaves and stems pubescent. Leaves ovate to orbicular-ovate. Flowers small, yellow, clustered at the ends of branches. Bracts 3, large, showy, in shades of red, exceeding the flower. Achenes 5-ribbed.

Commonly cultivated as a decorative climber in gardens and lawns for its handsome bracts.

Flowers : Jan.-June

J. K. Maheshwari 101

B. glabra Choisy in DC. Prodr. 13(2) : 437, 1849; Bailey, loc. cit.

A scandent or straggling shrub. Leaves and stems glabrous or subglabrous. Spines straight or almost lacking. Leaves broad ovate to ovate-oblong. Bracts magenta or purple-coloured.

Native of Brazil. Cultivated in gardens.

Mirabilis Linn.

M. jalapa Linn. Sp. Pl. 177, 1753; Merr. Enum. 2 : 132; Bailey, loc. cit.

An erect, much-branched herb or undershrub. Leaves 5-10 × 3-6 cm., ovate, truncate or cordate. Flowers 6 × 4 cm., white, red or yellow, showy, in a calyx-like involucre. Corolla tube elongated. Fruits leathery.

Native of Trop. America. Commonly cultivated as a pot plant in private and public gardens. The flowers open late in the afternoon.

Local name : Gulabbas ; English name : Four O'Clock

Flowers and Fruits : Aug.-Dec.

J. K. Maheshwari 363

Boerhavia Linn.

For a correct spelling of the generic name, see Sprague in Kew Bull. 348, 1928.

Leaves in unequal pairs; flowers smaller, in heads *B. diffusa*
Leaves in nearly equal pairs; flowers larger, in long-pedicelled umbels *B. repanda*

B. diffusa Linn. Sp. Pl. 3, 1753; FUGP. 3 : 2.

B. repens Linn. Sp. Pl. 3, 1753; FBI. 4 : 709.

B. procumbens Roxb. Fl. Ind. 1 : 146, 1832.

A spreading, much-branched herb, prostrate or ascending along walls. Tap root stout. Leaves in unequal pairs, broad ovate or suborbicular,

cordate. Flowers pink or whitish, minute, in small, bracteate umbels of 4-10, arranged in long-stalked, axillary and terminal panicles. Fruits clavate, 5-ribbed, viscidly glandular on the ribs.

An abundant and very common weed in all parts of Delhi; highly variable from place to place. Grows very commonly on the unused lawns and in the crevices of ancient walls. The leaves are believed to be useful against snake bite. The roots are used in cure of skin inflammations. The plant is used as fodder.

Local name : Santhi; Santh; Biskhafra

Flowers and Fruits : Major part of the year

J. K. Maheshwari 23

B. repanda Willd. Sp. Pl. 1 : 22, 1797; FBI. 4 : 709; FUGP. 3 : 3.

A diffuse, straggling or subscandent, robust herb or shrub-like plant. Internodes long. Leaves longer than those in the previous species, in nearly equal pairs. Flowers pink, in slender, long-peduncled umbels. Stamens much exserted. Fruits 7×2 mm., club-shaped, viscid-glandular.

Common, especially in the hedges of fruit orchards, where it is often found straggling amongst the bushes. It is frequently met with in the rainy days in Kingsway Camp, Sarai Rohilla and Sabzimandi Gardens.

Flowers and Fruits : June-Oct.

J. K. Maheshwari 69

84. Amaranthaceae

Leaves alternate :

Staminodes present between the stamens or forming a short hypogynous cup *Aerva*

Staminodes absent :

Ovary 2 to many-ovuled; flowers in simple or branched spikes *Celosia*

Ovary 1-ovuled; flowers in axillary clusters or in spikes or panicles:

Flowers bisexual, pink, in spikes; fruit a crustaceous nut *Digera*

Flowers unisexual or polygamous; fruit indehiscent or circumsciss *Amaranthus*

Leaves opposite or clustered :

Anthers 1-celled; leaves opposite :

Flowers in ovoid, terminal heads becoming cylindric later; stigma bifid *Gomphrena*

Flowers in axillary, clustered heads; stigma capitate *Alternanthera*

Anthers 2-celled :

Flowers perfect, in spikes :

Stamens 2, staminodes absent *Nothosaerva*

Stamens 5, with interposed staminodes *Achyranthes*
 Flowers fascicled; perfect flower one, imperfect ones several with
 hooked bristles *Pupalia*

Aerva Forsk. nom. cons.

For a correct spelling of the generic name, see Sprague in Kew Bull. 342, 1928.

Spikes only axillary; flowers uni- or bisexual *A. lanata*
 Spikes axillary and terminal; flowers dioecious *A. tomentosa*

A. lanata (Linn.) Juss. in Ann. Mus. Par. 11 : 131, 1808; FBI. 4 : 728; FUGP. 3 : 16; Merr. Enum. 2 : 130.

Achyranthes lanata Linn. Sp. Pl. 204, 1753.

A suberect, prostrate or diffuse herb. Stems and branches woolly-tomentose. Leaves 2-4 × 1-2 cm., alternate, white-woolly beneath, obovate or elliptic-rounded. Spikes 0.5-1.5 × 0.5 cm., clustered in the axils. Flowers greenish-white, bisexual. Anthers yellow. Seeds black, shining.

Common all over the area, especially in shady spots in garden hedges and fields. Used in the treatment of wounds.

Local name : Gedua ki chal

Flowers and Fruits : After rains

J. K. Maheshwari 344, Ridge; 405, Azadpur Road

A. tomentosa Forsk. Fl. Aegypt.-Arab. 122 & 727, 1775; FUGP. 3 : 15.

A. javanica Juss. in Ann. Mus. Par. 11 : 131, 1808; Royle, Ill. 320; FBI. 4 : 727.

An erect, woolly-tomentose herb or undershrub, up to 1 m. tall, branching from base. Leaves 2.5-6 × 0.5-1 cm., ovate-lanceolate, linear-oblong or linear, greenish-white. Flowers unisexual, sessile, in dense, white-woolly, up to 10 × 1 cm. spikes forming leafless, terminal panicles. Seeds dark brown, polished.

Common in waste places and unused ground near fields and the hilly tracts of Mehrauli and other places. Some plants, grown in the garden nursery, flowered almost throughout the year. The female plants are very common but the males are extremely rare; still the plant produces seeds, probably parthenogenetically. The flowering tops are sold in the market for decoration.

Local name : Dholimundi; Dholphulio; Kamheda

Flowers and Fruits : After rains

J. K. Maheshwari 343, Hauz Khas ; 1332

Celosia Linn.

Spikes unbranched, pale pink, dense

C. argentea

Spikes branched, forming a cockscomb, red or yellow

C. argentea Linn. Sp. Pl. 205, 1753; Royle, Ill. 320; FBI. 4 : 714; FUGP. 3 : 7; Merr. Enum. 2 : 127. *C. cristata*

An erect, glabrous, tall herb, sometimes up to 1.5 m. high. Stems angular, branched. Leaves 7.5-13 x 2.8-5 cm., linear, ovate-lanceolate, tapering at ends. Spikes terminal, dense, conical to long-oblong, 8-18 x 1.5-2 cm., pinkish-white. Flowers pale pink, closely imbricate. Capsules ellipsoid. Seeds 1.5 x 1.5 mm., black or brown, polished. A common weed in cultivated and fallow fields. The stems and twigs are used as vegetable and in medicine.

Local name : Chilnil; Sarwari; Sarai
Flowers and Fruits : Aug.-Oct.
J. K. Maheshwari 397

C. cristata Linn. Sp. Pl. 205, 1753; Royle, Ill. 320; FBI. 4 : 715; FUGP. 3 : 7.

An erect, glabrous, annual ornamental, tall and branched. Leaves linear to ovate-lanceolate. Inflorescence of usually fasciated and crest-like divisions of the branched spikes forming a cockscomb. Spikes cylindric, terminal, red or yellow. Stigmas bifid.

Commonly cultivated for ornamental purposes in gardens. Often found as an escape in waste places near gardens.

English name : Cockscomb
Flowers and Fruits : Dec.-March
J. K. Maheshwari 530

Digera Forsk.

D. alternifolia (Linn.) Aschers. in Schwfth. Beitr. Fl. Aethiopiens 180, 1867.

Achyranthes alternifolia Linn. Mant. 50, 1767 (non Linn. f.).

Digera arvensis Forsk. Fl. Aegypt.-Arab. 65, 1775; Royle, Ill. 320; FBI. 4 : 717; FUGP. 3 : 8.

A slender herb with spreading or erect branches. Leaves glabrous, variable, ovate, elliptic or lanceolate, up to 7.5 x 4 cm. Flowers pink or rose, in lax, axillary spikes. Fruits 3 x 3 mm., muriculate.

A weed of cultivated fields. Also common on the Ridge during rainy season. Sometimes it acts as a collateral host of some fungi. The leaves, tender twigs and tender inflorescences are used as vegetable and also as cattle fodder.

Local name : Lesua; Lhasua; Kundra; Kohendro; Tandla
Flowers and Fruits : During and after rainy season
J. K. Maheshwari 319

Amaranthus Linn.

Bracteoles awned or setaceous, equalling or exceeding the tepals; fruits circumsciss:

Stamens 5; tepals 5:

Spinous herbs or undershrubs; leaves ovate or oblong, obtuse *A. spinosus*

Spineless herbs; leaves acute or acuminate *A. hybridus* subsp. *cruentus* var. *paniculatus*

Stamens 3; tepals 3; leaves obtuse or emarginate *A. tricolor*

Bracteoles acute, hardly awned, shorter than the tepals; fruits usually indehiscent:

Fruits with an acute apex, indehiscent, rugose; flowers in axillary clusters and in terminal, paniced spikes *A. gracilis*

Fruits with a blunt apex; flowers in axillary clusters and terminal, simple or lobed spikes; fruits orbicular or broad ovate *A. blitum* var. *oleracea*

A. spinosus Linn. Sp. Pl. 991, 1753; FBI. 4 : 718; FUGP. 3 : 10; Merr. Enum. 2: 128.

An erect or diffuse, spinous herb or undershrub. Spines sharp, straight, divaricate. Leaves 3.5-6 × 1.5-2 cm., ovate or lanceolate, spine-tipped; base cuneate. Flowers green, unisexual, in dense, axillary, more or less globose clusters or in terminal and axillary, interrupted spikes. Male flowers with 5 stamens. Capsules ovoid, longer than broad. Seeds dark brown or black, shining, 1 × 1 mm.

A weed in cultivated fields and gardens. Common in open, waste places, on the slopes along roadsides and railway lines, near dirty water canals, etc. becoming gregarious and abundant at some spots. When the plant dies, the erect or prostrate, woody stumps are left on the ground for some time. Used as cattle fodder.

Local name : Kantevali chulai; Goja

Flowers and Fruits : During and after rainy season

J. K. Maheshwari 82; 239

A. hybridus Linn. subsp. *cruentus* Thell. var. *paniculatus* Thell. in Aschers. & Graebn. Syn. 5(1) : 247, 1914; Santapau in RBSI. 16(1) : 250, 1953.

A. paniculatus Linn. Sp. Pl. 1406, 1763; Merr. Enum. 2 : 128.

A stout, branching, tall herb. Stems grooved. Leaves 5-12 × 2-3.5 cm., ovate, ovate-oblong to ovate-lanceolate, prominently nerved beneath; base cuneate. Spikes dense, reddish-green or yellow, forming a close panicle, the central spike the longest. Flowers pentamerous. Capsules ovoid.

Occurs as an escape near fields, lawns and hedges.

Flowers and Fruits : Oct.-Dec.

J. K. Maheshwari 250

A. tricolor Linn. Sp. Pl. 989, 1753; Merr. Enum. 2 : 128; Santapau in RBSI. 16(1) : 249, 1953.

A. gangeticus Linn. Syst. 1268, 1759; FBI. 4 : 719; FUGP. 3 : 12.

A. polygamus Linn. Amoen. Acad. 4 : 294, 1759.

A. melancholicus Linn. Sp. Pl. 989, 1753.

A. oleraceus Willd. Sp. Pl. 4 : 386, 1805 (non Linn.); Wt. Ic. t. 715.

An erect, diffuse, branching, stout herb. Leaves 5-10 x 2.5-4 cm., variable, rhomboid or deltoid-ovate. Flowers in axillary, dense clusters, forming long, distantly interrupted spikes, trimerous. Bracts and sepals acute or awned. Capsules ovoid, rugose. Seeds black, biconvex, 1.5 x 1.5 mm.

Occurs in waste places or along roads.

Flowers and Fruits : Winter season

J. K. Maheshwari 1213, Grand Trunk Road

A. gracilis Desf. Tabl. Hort. Par. 43, 1804.

A. viridis Hook. f. in FBI. 4 : 720, 1885 (non Linn.); FUGP. 3 : 13.

An erect, glabrous, branching annual, 30-60 cm. tall. Leaves 2.5-7.5 x 2-5 cm., ovate or deltoid-ovate; base truncate or cuneate. Flowers pale green, in small, axillary clusters and in axillary and terminal, panicle, spike-like racemes; male and female flowers mixed. Stamens 3. Fruits acute, compressed, suborbicular, rugose. Seeds 1 x 1 mm., lenticular, black, shining.

Common in waste, dry or moist places, near field-canals and cultivated fields during rainy and cold seasons. The tender parts and inflorescences are cooked as vegetable.

Local name : Chulai

Flowers and Fruits : After rains

J. K. Maheshwari 284

A. blitum Linn. var. *oleracea* Hook. f. in FBI. 4 : 721, 1885; FUGP. 3 : 13.

A tall, erect or suberect, glabrous herb. Leaves ovate-oblong or rounded, retuse, cuneate, prominently nerved beneath. Flowers yellowish-green, in axillary clusters and terminal, simple or branched spikes, trimerous. Utricle broad ovate. Seeds lenticular, polished.

Cultivated. Also found as an escape or weed in moist places. The aerial parts are eaten as vegetable.

Local name : Chaulai

Gomphrena Linn.

Stems erect; flower heads variously coloured *G. globosa*

Stems spreading on the grounds; flower heads white *G. celosioides*

G. globosa Linn. Sp. Pl. 224, 1753; FBI. 4 : 732; FUGP. 3 : 21; Merr. Enum. 2 : 132; Bailey, Man. Cult. Pl. 356.

An erect, branching, hairy annual. Leaves $5-10 \times 2-3$ cm., elliptic-oblong. Flower heads 2.5×2 cm., globular, purple, red or variously coloured, long-peduncled.

A cosmopolitan weed. Cultivated as a garden favourite, but often found as an escape from cultivation in waste places near gardens and also on the Ridge.

English name : Globe amaranth; Bachelor's button

Flowers : After rains

J. K. Maheshwari 852

G. celosioides Mart. in Nov. Act. Nat. Cur. 13: 301, 1826; Sandwith in Kew Bull. 29, 1946.

A low spreading, much-branched herb with a stout tap root. Branches clothed with white, shaggy hairs, ascending. Leaves $2.5-5 \times 1-2$ cm., spatula-shaped or oblong-elliptic, mucronate, cuneate at base, with long, white, shaggy hairs beneath. Flowers white, compressed in dense, cylindrical or ovoid, terminal, $2.5-5 \times 2-2.5$ cm. spikes, subtended by two small leaves. Perianth lobes 5, cottony-woolly. Styles short; stigmas 2-lobed. Fruit enclosed by the hardened perianth. Seeds brown, 1.5×1 mm.

Native of S. Brazil, Paraguay, Uruguay and Argentina. A recently introduced weed, which is rapidly spreading throughout Delhi. It is found amongst grasses, on roadsides and cultivated ground, in gardens and lawns, becoming troublesome at places.

Local name : Kasia

Flowers and Fruits : April-Aug.

J. K. Maheshwari 185, Azadpur Road

Alternanthera Forsk.

Leaves suborbicular or nearly circular; perianth segments spine-tipped; stamens 5 *A. pungens*

Leaves linear-oblong, elliptic or oblanceolate; perianth segments not spine-tipped; stamens 3 *A. sessilis*

A. pungens H. B. & K. Nov. Gen. & Sp. 2 : 206, 1818; Melville in Kew Bull. 174, 1958.

A. echinata Sm. in Rees, Cyclop. 39 : Suppl., No. 10, 1819.

A. repens Link, Enum. Pl. Hort. Berol. 1 : 154, 1821 (non J. F. Gmel. 1791).

A prostrate or decumbent, spreading herb. Stems zigzag, clothed with shaggy hairs. Leaves suborbicular or nearly circular, obtuse, entire, tapering at the base, hairy. Flowers in axillary heads. Tepals becoming spiny in fruit. Stamens 5.

Native of Trop. America. A recently introduced weed; has become well established along roadsides, in fallow fields, waste places, along

railway lines and near gardens and habitations. Also introduced on the Ridge in recently disturbed soils. Eaten at times of famine.

Local name : Kantevali santhi

Flowers and Fruits : Aug.-Nov.

J. K. Maheshwari 394, Uzirpur, Karnal Road

A. sessilis (Linn.) DC, Cat. Hort. Monsp. 77, 1813 ; Melville in Kew Bull. 172, 1958.

Gomphrena sessilis Linn. Sp. Pl. 225, 1753.

Alternanthera repens J. F. Gmel. Syst. Nat. 2 : 106, 1791.

A prostrate, spreading, polymorphic, glabrous herb, often rooting at the nodes. Branches many, often light purplish-grey. Leaves glabrous, elliptic, linear-oblong or oblanceolate, tapering towards the base. Flowers white, shining, in small, axillary, sessile, chaffy heads. Utricle broadly obcordate or orbicular. Seeds suborbicular.

A weed in cultivated fields and waste places. Also common in damp places along the borders of ponds and tanks or grows as an aquatic in shallow water. A highly variable herb, depending on habitat conditions.

Flowers and Fruits : Rainy season

J. K. Maheshwari 91 ; 136 ; 818

Nothosaerva Wt.

N. brachiata (Linn.) Wt. Ic. 6 : 1, 1853; FBI. 4 : 726; FUGP. 3 : 17.

Illecebrum brachiatum Linn. Mant. 213, 1771.

An erect or diffuse, much-branched, glabrous herb. Leaves 2-4 x 1-2 cm., thinly membranous, elliptic or ovate-lanceolate, tapering to the base. Flowers greenish-white, in small, dense, axillary, 6-10 x 3 mm. spikes. Stamens 2. Seeds minute, dark brown, shining.

Rare. Occurs in moist crevices between rocks or in soils near temporary ponds in the hilly tracts near Faridabad and in low-lying areas of Najafgarh.

Flowers and Fruits : Sept.-Feb.

J. K. Maheshwari 428; 816

Achyranthes Linn.

A. aspera Linn. var. *porphyristachya* Hook. f. in FBI. 4 : 730, 1885 ; Santapau in RBSI. 16(1): 251, 1953.

A. porphyristachya Wall. Cat. 6925, 1832, nom. nud.

An erect or subscandent herb or undershrub. Leaves large, ovate, acute or acuminate, glabrous or nearly so. Flowers greenish-white, deflexed, in terminal spikes elongating in fruit. Bracts and bracteoles persistent, ending in a spine. Utricle oblong. Seeds subcylindrical, brown.

Common throughout the Ridge, in waste places, along fences of gardens, etc. A very troublesome weed when in fruit, due to its spinous bracteoles and pointed tepals. The ash is used in the treatment of cough and the flowering spikes and seeds are used against snake bite. The decoction is given in renal dropsy.

Local name: Puthkunda; Lapa; Chirchitta; Balvala chirchitta; Monga

Flowers and Fruits : Throughout the year
J. K. Maheshwari 854

Pupalia Juss. nom. cons.

P. lappacea (Linn.) Juss. in Ann. Mus. Par. 2 : 132, 1803; FBL 4 : 724; FUGP. 3 : 19; Merr. Enum. 2 : 129.

Achyranthes lappacea Linn. Sp. Pl. 204, 1753.

An erect or straggling, woolly undershrub, branching from the base. Internodes long. Leaves ovate or elliptic, soft-tomentose. Flowers in axillary and terminal, long spikes. Bristles hooked, accrescent, stellately spreading, yellowish at maturity, subtended by a 3-nerved, aristate bracteole. Perianth woolly. Stamens pinkish. Seeds black, polished.

Common, especially in the hedges of fields and fruit orchards. Also met with in the hilly tracts, in depressed areas or growing amongst the thorny shrubs.

Local name : Jhojhru; Din ka tara; Bhurat; Chirchitta

Flowers and Fruits : After rains

J. K. Maheshwari 317, Old Delhi Ridge

85. Chenopodiaceae

Flowers usually bisexual, all similar :

Leaves flat :

Roots tuberous; cultigens

Beta

Roots not tuberous; plants wild:

Fruiting perianth with transverse wings

Kochia

Fruiting perianth not winged

Chenopodium

Leaves fleshy, half-terete :

Perianth lobes transversely winged

Salsola

Perianth lobes not winged

Suaeda

Flowers unisexual, dimorphic; utricle enclosed in a capsule-like, bracteal body

Spinacia

Beta Linn.

B. vulgaris Linn. Sp. Pl. 222, 1753; Bailey, Man. Cult. Pl. 353.

A glabrous, tuberous herb. Leaves mostly basal, ovate to oblong-

ovate, passing into linear bracts in the inflorescence. Flowers greenish, many, in open panicles.

A winter season cultigen in fields and gardens, grown for its roots which are eaten raw or cooked as vegetable. Available in the market from Nov. to April. Continuous supply of moisture is necessary for its growth. The cultivars Crimson Globe (early), Egyptian Early Yellow, Sunset, Globe and Blood Red (long beet) are grown in the area.

Local name : Chukandar

Kochia Roth

K. indica Wt. Ic. t. 1791, 1852; FBI. 5 : 11 ; FUGP. 3 : 24.

An erect or diffuse, much-branched bush. Stems and branches woody, white, woolly-hairy. Leaves $2-3 \times 0.5$ cm., linear-lanceolate or elliptic, loosely hairy especially beneath, subsucculent. Flowers axillary, solitary or paired. Perianth woolly. Stamens deep orange, exerted. Utricle membranous. Seeds very minute, very light.

A so-called 'miracle' plant; found on dry soil, on unused areas, along roadsides and dry, canal banks; often gives rise to green clumps. It does not occur in the hilly parts but can be seen in areas around Old Fort, Okhla and Najafgarh. Also common near the aerodromes of Delhi. When vegetative, the leaves are larger and borne close to one another; on flowering shoots they are smaller and borne distantly. The plant is much liked by camels and cattle. The dried plants are used as fuel.

Local name : Bui

Flowers and Fruits : July-Nov.

J. K. Maheshwari 322; 440; 475

Chenopodium Linn.

Strongly foetid-smelling undershrubs; stigmas usually 5 *C. ambrosioides*

Tall or short, scentless herbs; stigmas 2 :

Seeds smooth, shining *C. album*

Seeds rugose, dull black *C. murale*

C. ambrosioides Linn. Sp. Pl. 219, 1753; Merr. Enum. 2 : 125; Haines, Bot. Bih. & Or. 770.

An erect, strongly foetid-smelling, woolly-puberulous, much-branched shrub, 90-150 cm. tall, often gregarious, pale green in appearance. Stems ribbed, often purple-tinged, leafy. Leaves $4-10 \times 2-3.5$ cm., oblong-ovate, sinuate-dentate, the upper subentire. Flowers greenish, some turning to purplish, in small clusters forming slender, axillary, interrupted and terminal, simple or paniculate spikes. Bracts fleshy. Perianth 5-lobed, clasping the fruit. Stigmas usually 5, spreading. Utricle membranous, 1-seeded. Seeds brown, polished, smooth, about 1×1 mm.

This has become
Dysphania
ambrosioides

Native of Mexico. A recently introduced weed; often grows gregariously either by itself or along with *Xanthium strumarium* Linn., in moist, undisturbed, waste places near gardens and along roadsides. The plant emits a strong, camphoraceous odour.

Local name : Khatua

Flowers and Fruits : April-Sept.

J. K. Maheshwari 154, Shahdara ; 987, near Azadpur

C. album Linn. Sp. Pl. 219, 1753; FBI. 5 : 3 ; FUGP. 3 : 22.

An erect herb, green or coated with white, mealy, granular pubescence. Stems ribbed, woody in tall plants. Leaves variable in size, entire, toothed or lobed, rhombic-oblong or deltoid-ovate. Flowers in terminal and axillary clusters, forming compact, panicle spikes, the terminal spikes becoming thyrsoid. Styles 2.

A common winter and summer weed in waste places and dry, gravelly soils of ancient buildings and cultivated grounds; sometimes cultivated. There are two spontaneous crops every year in fallow fields, the summer plants being somewhat bitter. Some abnormal specimens attain a height of 3 m. or more. The leaves and tender twigs are used as vegetable and also in a curd preparation known locally as 'Raita'. Also used as fodder.

Local name : Bathua; Chandan bathua; Bathu

Flowers and Fruits : Aug.-Dec.

J. K. Maheshwari 986; 1346

C. murale Linn. Sp. Pl. 219, 1753; FBI. 5 : 4; FUGP. 3 : 23.

A glabrous, erect herb. Stems 15-45 cm. high, ribbed. Leaves 4-10 × 3-4.5 cm., outline rhomboid or ovate-deltoid, 3-nerved at base, lobed or sharply toothed. Flowers green, in clusters of lax or dense, axillary, divaricate cymes, the terminal panicle leafless. Stamens yellow. Seeds orbicular, dull black, rugose.

A winter season weed; common in moist, shady situations in cultivated fields, waste places, etc. Used as fodder.

Local name : Khartua

Flowers and Fruits : Dec.-March

J. K. Maheshwari 1164

Salsola Linn.

S. baryosma (Roem. & Schult.) Dandy in F.W. Andr. Fl. Pl. Anglo-Egypt. Sud. 1 : 111, 1950.

Chenopodium baryosmon Roem. & Schult. Syst. 6 : 269, 1820.

Salsola foetida Delile, Fl. Égypte 57, 1813, nom. nud.; FBI. 5 : 18, 1886; FUGP. 3 : 26.

An erect, much-branched, ascendingly spreading, hoary undershrub.

Stems pale or purplish in vegetative state. Branches crowded, horizontal. Leaves minute, broad ovate to subglobose, fleshy; floral leaves imbricate. Flowers in short, cylindric spikes. Perianth silvery-white, accrescent, with broad, horizontal, membranous wings. Stigmas 2.

Common in the saline and waste, sandy tracts, either growing by itself or associated with *Suaeda fruticosa* Forsk. and *S. maritima* Dumort.

Flowers : June-Sept. Fruits : Winter season
J. K. Maheshwari 282, Okhla

Suaeda Forsk. ex. Scop.

Stigmas 3

Stigmas 2

S. fruticosa

S. maritima

S. fruticosa (Linn.) Forsk. Fl. Aegypt.-Arab. 70, 1775; FBI. 5 : 13; FUGP. 3 : 24; Parker, For. Fl. 416.

Chenopodium fruticosum Linn. Sp. Pl. 221, 1753.

An erect or prostrate, much-branched undershrub. Stems pale or purplish tinged; branches horizontally spreading or ascending. Leaves 5-15 × 2-3 mm., crowded all round the axis, succulent, flattish, linear or oblong. Flowers green, bisexual, turning red at maturity, axillary, solitary or clustered, the upper ones forming slender, leafy spikes. Perianth persistent. Utricle turbinate, membranous, spongy. Seeds obliquely ovoid, beaked, black, shining.

Abundant in the saline tracts and unused fallow ground, where it dominates the vegetation; either grows by itself or associated with *Salsola baryosma* Dandy, *Kochia indica* Wt., *Chenopodium album* Linn., *Sporobolus marginatus* Hochst., *Alhagi pseudalhagi* Desv., and *Cressa cretica* Linn. Very common on the waste lands near Model Town. Used as cattle fodder and the dried parts are burnt as fuel.

Local name : Bui; Lonia; Nunkhuri

Flowers and Fruits : Dec.-June

J. K. Maheshwari 1101

S. maritima (Linn.) Dumort. Fl. Belg. 22, 1827; FBI. 5 : 14; FUGP. 3 : 25.

Chenopodium maritimum Linn. Sp. Pl. 221, 1753.

An erect, annual, robust herb. Stems woody; branches many, horizontal. Leaves linear-oblong, fleshy, borne all round, often turning red at maturity. Flowers in small, subglobose clusters, forming slender, loose, elongate spikes. Perianth of 5, fleshy lobes, enclosing the fruit. Stigmas 2, whitish. Seeds black, shining.

Common in the saline tracts and fallow fields, especially near Okhla, Shahdara and Timarpur, often dominating the ground with its dense growth.

Local name : Bui; Lonia; Nunka

Flowers and Fruits : Dec.-June

Spinacia Linn.**S. oleracea** Linn. Sp. Pl. 1027, 1753; Bailey, Man. Cult. Pl. 354.

An erect, annual, smooth herb, forming large, radical leaves. Cauline leaves smaller, becoming lanceolate in the inflorescence. Flowers unisexual, the staminate in spikes or panicles; the pistillate clustered. Utricle enclosed in a spined, capsule-like body.

Both prickly-seeded (triangular-leaved) and smooth-seeded (round-leaved) varieties are cultivated during winter season in fields and gardens for its leaves which are much used as vegetable. Often spontaneous in moist, waste places near gardens. Sold throughout the year.

Local name : Palak

Flowers : June-July

J. K. Maheshwari 36, Timarpur

86. Basellaceae**Basella** Linn.**B. rubra** Linn. Sp. Pl. 272, 1753; Lamk. Tabl. Encycl. t. 215, f. 1, 1792; FBI. 5 : 20; FUGP. 3 : 27; Merr. Enum. 2 : 137.**B. alba** Linn. Sp. Pl. 272, 1753.

A glabrous, twining, succulent shrub. Leaves broad ovate, cordate, subsucculent, entire, glossy. Flowers pinkish or pale purple, in lax, axillary, peduncled spikes. Perianth fleshy. Utricle black, ovoid.

Grown on trellises and hedges around gardens for its leaves which are used as vegetable.

Local name : Poi

Flowers and Fruits : Sept.-Feb.

J. K. Maheshwari 486

87. Polygonaceae

Habit erect; ocreae large :

Perianth 4 to 5-merous, segments not toothed; stigmas capitellate .

Perianth whorls 2, each 3-merous, inner segments enlarged and

toothed or comb-shaped; stigmas fimbriate .

Habit climbing .

Polygonum Linn.

Nuts nearly included in the perianth :

Flowers in axillary clusters; herbs with small leaves and hyaline stipules

P. plebeium

Flowers in terminal, racemose, spicate or capitate inflorescence ;
 Inflorescence capitate
 Inflorescence in elongate, stout or filiform racemes or spikes : *P. chinense*
 Nutlets biconvex :
 Bracts densely white-woolly; whole plants white-tomentose or
 cottony

Bracts glabrous; plants glabrous *P. lanigerum*
 Nutlets trigonous: *P. glabrum*

Racemes slender, filiform; bracts more or less distant;
 flowers pink; perianth glandular
P. hydropiper subsp. *microcarpum* var. *lenticularis*

Racemes stout and short with closely imbricate bracts; flowers
 white; perianth eglandular *P. barbatum* subsp. *gracile*

Nutlets much exceeding the perianth *P. fagopyrum*

P. plebeium R. Br. Prodr. 420, 1810; FBI. 5 : 27; FUGP. 3 : 31; Merr.
 Enum. 2 : 124.

A prostrate, diffusely branched, glabrous herb, often with a woody
 rootstock. Leaves $10-25 \times 2-3$ mm., oblong, linear or obovate; stipules
 hyaline, short. Flowers 3×3 mm., rosy, solitary, axillary or 2-3 together.
 Perianth free nearly to the base. Nutlets 3-gonous, shining, black.

A very variable plant; common throughout especially in misot, shady
 places. Used medicinally.

Local name : Machechi ; Macheti

Flowers and Fruits : Rainy season

J. K. Maheshwari 30

P. chinense Linn. Sp. Pl. 363, 1753; Merr. op. cit. 122; Haines, Bot.
 Bih. & Or. 780.

A diffuse, much-branched, scrambling undershrub. Leaves $10-15 \times$
 $4-7$ cm., broad ovate to oblong; stipules very membranous. Flowers
 white, in capitate heads forming axillary and terminal, divaricate, pubes-
 cent panicles. Bracts scarious.

Cultivated in gardens.

Flowers and Fruits : Jan.-May

J. K. Maheshwari 657, Rajghat Compound ; 783

P. lanigerum R. Br. Prodr. 419, 1810; FBI. 5 : 35; FUGP. 3 : 34; Merr.
 Enum. 2 : 123.

An erect, robust perennial, 60-150 cm. high. Stems clothed with
 white tomentum, swollen above the nodes. Leaves $10-20 \times 1.8-3$ cm.,
 linear-lanceolate, densely white-woolly beneath. Flowers white or pink,
 crowded in slender, $40-70 \times 5-8$ mm. racemes. Nutlets orbicular.

Rare; found partly under water or along the banks of canals and ponds.

Flowers and Fruits : Oct.-Dec.

J. K. Maheshwari 523, pond in Roshanara Gardens

P. glabrum Willd. Sp. Pl. 2: 447, 1799; FBI. 5 : 34, in part; FUGP. 3 : 35; Merr. loc. cit.

An erect or decumbent, glabrous, stout annual. Stems 60-150 cm. high. Leaves $7.5-17.5 \times 2-3$ cm., lanceolate, acuminate, glandular-punctate. Ocreae non-ciliate. Flowers pink, in erect racemes forming a terminal panicle. Perianth eglandular. Anthers reddish. Nutlets nearly orbicular, biconvex, dark brown, polished.

Common in marshes and along canal banks, often associated with other species of *Polygonum* and marshy grasses or sedges.

Local name : Nali

Flowers and Fruits : Sept.-March

J. K. Maheshwari 550, near Jamuna Bridge

P. hydropiper Linn. subsp. *microcarpum* Danser var. *lenticularis* Danser in Bull. Jard. Bot. Buitenz. (sér. 3) 8 : 189, 1927.

P. hydropiper Meissn. in DC. Prodr. 14 : 109, 1856, in part; Hook. f. in FBI. 5: 39, 1886; Gage in RBSI. 2: 401 & 425, 1903; FUGP. 3 : 37.

A glabrous, robust herb, up to 1 m. tall. Stems prostrate and rooting below, with minute, secretory glands. Leaves $6-12 \times 1.5-2.5$ cm., lanceolate or oblong-lanceolate, tapering at ends; margins ciliate. Stipules glandular, shortly ciliate or eciliate. Flowers pink, in slender, filiform, flexuous, $6-10 \times 0.3$ cm. racemes; bracts more or less distant. Nutlets opaque, granulate, shining.

Common in marshes and along canal banks, often associated with other species of *Polygonum* and differs chiefly in its slender, filiform racemes with somewhat distant bracts. The plant is known for the biting taste of its leaves.

Flowers and Fruits : Oct.-March

J. K. Maheshwari 551, Hindan River; 622, Roshanara Gardens

P. barbatum Lian. subsp. *gracile* Danser in Bull. Jard. Bot. Buitenz. (sér. 3) 8: 146, 1927.

P. barbatum Hook. f. in FBI. 5 : 37, 1886.

P. serrulatum Hook. f. in FBI. 5 : 38, 1886 (excl. var. *domii*), (non *Lagasca* nec. Meissn. nec. Miq.).

An erect, glabrous annual, 60-120 cm. high, prostrate and rooting below. Leaves $5-15 \times 3.5-5$ cm., linear or elliptic-oblong, acute or acuminate; margins ciliate. Stipules strigose, nerved, with bristles on the margin as long as or shorter than the tube. Flowers white, in short, stout, spiciform panicles. Bracts glabrous, with several, rough bristles from the top. Perianth eglandular. Nutlets trigonous, polished.

Common in marshy places, along canal banks and in temporarily wet ground near gardens, along roadsides, etc. Goats eat this plant.

Local name : Mirchi; Jalbahar; Ban bhauch

Flowers and Fruits : Aug.-May

J. K. Maheshwari 300, pond in Roshanara Gardens

P. fagopyrum Linn. Sp. Pl. 364, 1753; Santapau in RBSI. 16(1): 254, 1953.

Fagopyrum esculentum Moench, Meth. 290, 1794; Bailey, op. cit. 349.

A glabrous, much-branched undershrub, 30-100 cm. tall. Leaves 4-8 x 3.5-5 cm., triangular-ovate, cordate. Flowers white, in terminal, subcapitate cymes. Nutlets distinctly triangular, with sharp angles and flat sides.

Cultivated for its grain.

English name : Buckwheat

Flowers and Fruits : Cold season

J. K. Maheshwari 31

Rumex Linn.

R. dentatus Linn. Mant. 2 : 226, 1771; FBI. 5 : 59; FUGP. 3 : 41.

An erect, deep-rooted, glabrous annual, 30-100 cm. high. Roots red-coloured. Stems ribbed. Radical leaves much longer than cauline ones, 10-15 x 3-7 cm., oblong, obtuse, rounded or cordate. Flowers green, bisexual, in leafy or leafless, verticillate clusters. Perianth 5 x 3 mm., biseriate; inner segments tubercled on the back; the teeth much enlarged in fruit turning to brownish-red. Nutlets acutely trigonous, brown.

Common and sometimes abundant near canal banks, in fruit orchards and similar moist situations.

Local name : Lalbibbi; Jangli chorai; Jangli palak; Khat palak

Flowers and Fruits: Jan.-June

J. K. Maheshwari 601, Najafgarh

Antigonon Endl.

A. leptopus Hook. & Arn. Bot. Beech. Voy. 308, t. 69, 1841; Bailey, Man. Cult. Pl. 351; Bor & Raiz. 265.

A large, handsome, climbing shrub. Leaves ovate, veiny, acute to acuminate, glabrous. Flowers showy, pink or red, in copious racemes which terminate into tendrils. Perianth lobes petaloid, the 3 outer ones larger.

Native of S. America. Commonly planted in gardens, along trellises and poles.

English name : Coral creeper

Flowers : Cold season

J. K. Maheshwari 364

88. Aristolochiaceae

Aristolochia Linn.

A herb; plants wild

A climbing shrub; plants cultivated

*A. bracteata**A. elegans**A. bracteata* Retz. Obs. 5 : 29, 1788; FBL 5 : 75; FUGP. 3 : 44; Singh in Ind. Jour. Agric. Sci. 15(6) : 302, 1945.A glabrous, prostrate herb. Leaves $4.6 \times 3.5-4.5$ cm., glaucous, reniform or broad ovate, deep cordate; basal lobes rounded. Flowers 50×5 mm., dark purple, solitary, tubular, with trumpet-shaped mouth. Capsules oblong-ellipsoid, ribbed, 2.5×1.5 cm.

Rare. It is an extremely bitter plant and is used as an anthelmintic.

Local name : Kiramar

Flowers : Greater part of the year

J. K. Maheshwari 505

A. elegans Mast. in Gard. Chron. 2 : 301, 1885; Merr. Enum. 2 : 119; Bailey, op. cit. 346; Bor & Raiz. 26, f. 22.

A glabrous, climbing shrub. Leaves broadly reniform-cordate, obtuse or rounded, long-petiolate; basal lobes rounded. Flowers blotched with dark purple or violet-brown, white outside, solitary. Perianth tube elongated, yellowish-green; limb nearly circular.

Native of tropical America. Grown as an ornamental climber along the trellises, forming a dense screen with its foliage.

Flowers : Oct.-Dec.

J. K. Maheshwari 1448

89. Proteaceae

Grevillea R. Br. nom. cons.*G. robusta* A. Cunn. in R. Br. Prot. Nov. 24, 1830; Parker, For. Fl. 430; Bailey, op. cit. 345.A lofty, robust, oakaceous tree with hoary or rusty-tomentose, young branches. Leaves fern-like, bipinnate or sometimes tripinnate; pinnae entire or deeply pinnatifid, lanceolate. Flowers greenish-yellow mixed with orange, in secund, one-sided, showy racemes. Ovaries stipitate; style long, lateral. Fruit an oblique, coriaceous, 1.6×1 cm. follicle, brown. Seeds 1 or 2, winged.

Native of Queensland and New South Wales. Planted in lawns, shrubberies, hedges, gardens and along roadsides. Grows favourably in the climate of Delhi and attains a good height.

English name : Silk-oak

Flowers : March-April. Fruits : May-July

J. K. Maheshwari 651, University Compound

90. Loranthaceae

Dendrophthoe Mart.

- D. falcata* (Linn. f.) Ettings. in Denkschr. Akad. Wissen. Math.-Naturw. 32 : 52, 53, 58, t. 13, f. 14, 1872; Santapau in RBSI. 16(1): 262, 1953.
Loranthus falcatus Linn. f. Suppl. 211, 1781.
L. longiflorus Desr. in Lamk. Encycl. 3 : 598, 1792; FBl. 5 : 214; Wt. Ic. t. 302.

A much-branched, stout, leafy, partial parasite. Leaves opposite, 10-15 × 5-8 cm., leathery, variable in shape, 6-12 × 2.5-6 cm., brittle, dull-coloured; midrib distinct in the lower part. Flowers vermilion or deep orange, 50 × 4 mm., crowded in short racemes on leafless nodes, bracteate. Stamens exserted. Stigmas knob-shaped. Fruits ovoid-oblong, black when ripe.

Met during the cold season on the Ridge and also in gardens. The more common hosts are *Acacia leucophloea* Willd., *Ehretia laevis* Roxb., and *Dalbergia sissoo* Roxb.; also seen sometimes on *Ficus benghalensis* Linn., and *F. religiosa* Linn.

Local name : Banda

Flowers : Nov.-Jan. Fruits : Feb.-April

J. K. Maheshwari 782, Old Delhi Ridge

91. Euphorbiaceae

Flowers in cyathia, i.e. reduced to single stamens enclosed in an involucre with a single, central, female flower, the whole resembling a single flower.

Juice always milky *Euphorbia*

Flowers not in cyathia, not reduced to single stamens or a single ovary contained in an involucre :

Cells of ovary 1-ovuled; juice sometimes milky:

Petals present in one or both sexes, or if absent, calyx petaloid :

Leaves palmately lobed or panduriform *Jatropha*

Leaves not palmately lobed :

Erect or prostrate, whitish or purple-tinged herbs; seeds non-strophiolate *Chrozophora*

Erect, woody, green herbs; male flowers white; seeds with a white, spongy cap *Croton*

Petals absent in both sexes :

Stamens many; capsules prickly; shrubs or small trees . . .

. *Ricinus*

Stamens few; capsules not prickly :

Erect herbs or shrubs; leaves eglandular at base . . .

. *Acalypha*

Trees; leaves 2-glandular at base *Sapium*

- Cells of ovary 2-ovuled; juice very rarely milky:
 Style arms much dilated; fruit an indehiscent drupe *Putranjiva*
 Styles and style arms slender :
 Male flowers with a large, 2 to 3-fid pistillode; dioecious shrubs *Securinega*
 Pistillode absent in males :
 Disc none in either sex, combined with the calyx lobes; shrubs or small trees *Melanthesa*
 Disc present in the female and often in the male flowers; herbs, shrubs or trees :
 Fruit a dry capsulo; herbs *Phyllanthus*
 Fruit a berry :
 Shrubs; fruit small, fleshy, dark purple *Kirganelia*
 Trees; fruit large, fleshy, pale yellow *Emblica*

Euphorbia Linn.

- Plants armed with stipular spines :
 Woody, small shrubs; flowers crimson *E. milii*
 Erect shrubs or trees; flowers yellowish *E. nerifolia*
 Plants unarmed :
 Inflorescence with brilliant, scarlet, bracteal leaves; a garden shrub *E. pulcherrima*
 Bracts green or pale :
 Involucres with a single, large gland; an introduced, erect herb or undershrub *E. geniculata*
 Glands of involucre not large; erect or prostrate, small herbs :
 Erect herbs; leaves alternate to opposite; involucre glands 2-horned *E. dracunculoides*
 Prostrate or ascending herbs; leaves all opposite; involucre glands not 2-horned :
 Leaves 1.2-4 cm. long; prostrate or ascending herbs :
 Involucre glands bordered by a conspicuous, rounded limb; glabrous or puberulous herbs *E. hypericifolia*
 Involucre glands with very small or obsolete limb; hispid-hairy herbs *E. hirta*
 Leaves less than 1.2 cm. long; prostrate herbs :
 Capsules glabrous; plants glabrous *E. clarkeana*
 Capsules pubescent or hirsute; stems hairy or hispid-hairy:
 Capsules hairy only along the keels *E. prostrata*

Capsules pubescent or hirsute throughout ;
 Leaves crenulate; capsules pubescent ; seeds
 furrowed *E. thymifolia*
 Leaves entire; capsules hirsute ; seeds pitted ,
E. granulata

E. milli Ch.-des-Moulins in Bull. Hist. Nat. Soc. Linn. Bordeaux 1 :
 27-30, Pl. 1, 1826; Croizat in Jour. Arn. Arb. 21 : 506, 1940.
E. splendens Boj. ex Hook. in Bot. Mag. 1. 2902, 1829.

A small, much-branched, somewhat climbing, spiny shrub, becoming
 90-130 cm. long, armed with needle-like spines. Leaves borne all round
 the stem, fascicled, $3.5 \times 1.2-1.7$ cm., spatulate or obovate. Flowers
 showy, crimson, in long-peduncled, dichotomous cymes; each cyathium
 subtended by 2 hemispheric, cuspidate, bright red bracts.

Grown as an ornamental on rockeries in gardens and in hedges,
 along with other euphorbias and cacti.

Flowers : Major part of the year
 J. K. Maheshwari 1002

E. neriifolia Linn. Sp. Pl. 451, 1753; FUGP. 3 : 76.

An erect, succulent shrub or small tree. Branches terete, with 5,
 more or less spirally twisted ribs. Twin spines sharp, persistent, divergent
 from a tubercled base. Involucres ternate, yellowish; the lateral ones
 pedicelled and bisexual; the central flower usually male and sessile.
 Glands transversely oblong, yellow.

Often planted as a field and boundary fence and as curios on rockeries
 in gardens and verandahs in front of shops. The latex is used in tooth
 troubles.

Local name : Thor

Flowers : March-May

J. K. Maheshwari 1132

E. pulcherrima Willd. ex Klotz. in Otto & Dietr. Allgem. Gartenz. 2 :
 27, 1834; Merr. Enum. 2 : 463.

Poinsettia pulcherrima R. Grah. in Edinb. N. Phil. Jour. 20 : 412,
 1836; Bor & Raiz. 171, Pl. 60, 61.

An erect or diffuse, garden shrub. Leaves ovate-elliptic to lanceolate,
 long-petiolate; bracteal leaves rayed, bright vermilion-red or crimson-
 scarlet. Cyathia in cymes. Involucres bearing a large, yellow gland on
 one side.

Native of Mexico. It is the *Poinsettia* of local gardeners and florists;
 commonly planted in the hedges and shrubberies of gardens.

English name : *Poinsettia*

Flowers : Cold season

J. K. Maheshwari 785

E. geniculata Ortega. Nov. Rar. Pl. Matr. 18, 1797; FUGP. 3 : 83.

An erect or ascending, stout, fistular annual, up to 120 cm. tall. Leaves alternate below, opposite above, 10-15 × 5-8 cm., variable in shape, ovate-elliptic, elliptic-oblong to elliptic, hairy and whitish beneath; floral leaves green towards the apex and white near the base. Involucre 4 mm. long, 5-lobed, with one conspicuous, lateral gland. Capsules glabrous, 3-celled, sometimes 2-celled.

An introduced weed from tropical America. Found in garden beds with other ornamental herbs on moist, sandy soils. It comes up commonly in the nursery beds of the University Gardens. Also met on recently disturbed soils near gardens.

Flowers and Fruits: May-Dec.

J. K. Maheshwari 367

E. dracunculoides Lamk. Encycl. 2 : 428, 1788; FBI. 5 : 262; FUGP. 3 : 78.

An erect, smooth, dichotomously branched, deep-rooted herb. Branches many, leafy. Leaves 3-5.5 × 0.3-0.4 cm., linear to linear-lanceolate, alternate to opposite, 2-3 at each node. Involucres nearly sessile, solitary, glabrous; lobes ciliolate; glands moon-shaped. Flowers pale yellow. Capsules glabrous, about 5 × 4 mm. Seeds ellipsoid, strophiolate.

Common in cultivated and fallow fields on sandy and clayey, dry soils. Used as fodder.

Local name : Jaichi

Flowers and Fruits : April-Aug.

J. K. Maheshwari 810

E. hypericifolia Linn. Sp. Pl. 454, 1753; FBI. 5 : 249; FUGP. 3 : 80.

An erect or decumbent, glabrous annual, 15-60 cm. long. Branches often purplish. Leaves all opposite, very variable in shape, linear-oblong to elliptic-ovate, often serrulate. Involucres clustered, green, bordered by a conspicuous, white or pink limb; glands petaloid, pink. Capsules pubescent, bent. Seeds 4-angled, ellipsoid.

A common weed in fields, lawns and along canal banks on moist or dry, sandy soil; often mixed with grasses.

Flowers and Fruits : May-Oct.

J. K. Maheshwari 39

E. hirta Linn. Sp. Pl. 454, 1753; FUGP. 3 : 80; Merr. Enum. 2 : 462.

E. pilulifera auct. (non Linn.).

An annual, prostrate or ascending, hispid herb, branching from the rootstock. Leaves dark green or reddish above, white-villous beneath, 2.5-4 × 1.5-2 cm., elliptic or ovate-oblong with oblique bases. Cyathia axillary and terminal, clustered in dense, crowded cymes. Involucres

stalked, cup-shaped. Capsules about 1×1 mm., breaking into 3 cocci. Seeds reddish-brown, trigonous.

A common and abundant weed throughout on the Ridge, in cultivated and waste ground. Also met in the crevices of walls and unused land near habitations; often ascending along the walls.

Local name : Dudhi ; Dudhibel

Flowers and Fruits : Greater part of the year

J. K. Maheshwari 224

E. clarkeana Hook. f. in FBI. 5 : 253, 1887; FUGP. 3 : 82.

A prostrate, glabrous annual. Leaves up to 1.5×0.5 cm., opposite, glabrous, obliquely linear-oblong; base nearly auricled on one side. Involucres solitary, axillary, glabrous; glands minute. Capsules glabrous; cocci keeled. Seeds brown, 4-angled, obscurely rugose. Common on dry, sandy-clayey soils.

Local name : Dudhi; Dudhni

Flowers and Fruits: Aug.-Nov.

J. K. Maheshwari 1306 Vallabgarh

E. prostrata Ait. Hort. Kew. 2 : 139, 1789; Merr. op. cit. 463.

A prostrate or ascending, slender, annual herb. Branches minutely hairy, often on one side, purple. Leaves opposite, $5-10 \times 3$ mm., obliquely oblong, minutely serrate towards the tip. Involucres campanulate, usually paired. Glands usually 4, each with a minute petaloid limb. Capsules usually bent, about 1×1 mm.; cocci prominently keeled with stiff, spreading hairs on the keels. Seeds 4-angled, brown, transversely furrowed.

A new record from Delhi State. Introduced. Common and abundant throughout along roadsides, dry open places, in gardens and along gravelly walls. It much resembles *E. clarkeana* Hook. f. which, however, possesses glabrous capsules.

Flowers and Fruits : Major part of the year

J. K. Maheshwari 315

E. thymifolia Linn. Sp. Pl. 454, 1753; FBI. 5 : 252; FUGP. 3 : 81; Merr. op. cit. 464.

A small, prostrate, pubescent herb, divaricately branched. Leaves $5-10 \times 3-5$ mm., obliquely oblong, crenulate. Stipules fimbriate. Involucres small, 1-3. Capsules erect, obtusely keeled, hairy. Seeds transversely furrowed.

Common in waste places.

Flowers and Fruits : Aug.-Dec.

E. granulata Forsk. Fl. Aegypt.-Arab. 94, 1775; FBI. 5 : 252; FUGP. 3 : 81.

A small, prostrate, hispid-hairy herb, greenish or purplish in appearance. Leaves prominently oblique at base, opposite, entire, villous, 5-8 × 3-5 mm. Glands usually with a small, petaloid limb. Capsules hirsute, not keeled, about 1 × 1 mm. Seeds brown, 4-angular.

Common on dry, yellowish, sandy soils of fallow fields and also near the hilly tracts of Gurgaon district and Mehrauli.

Flowers and Fruits : Feb.-Aug.

J. K. Maheshwari 823, near Gurukul (Faridabad); 1155, Mehrauli

Jatropha Linn.

Leaves palmately lobed; young parts, petioles, etc. clothed with glandular bristles *J. gossypifolia*

Leaves panduriform; plants non-bristly *J. panduraefolia*

J. gossypifolia Linn. Sp. Pl. 1006, 1753; Parker, For. Fl. 461; Merr. Enum. 2 : 449; Bor & Raiz. 175, f. 108, Pl. 64.

A much-branched shrub. Stems grey-white to ash-coloured, with brown lenticels throughout. Young parts pale or deep purple. Petioles, leaf margins and young parts with numerous, fascicled and branched, glandular bristles. Leaves 3 to 5-deeply lobed. Flowers purplish-red-dish, monoecious. Capsules oblong, 3-lobed, brownish.

Uncommon. Introduced from Brazil; has become naturalized on the Ridge. Also planted in the hedges around gardens.

Flowers and Fruits : July-Sept.

J. K. Maheshwari 221; 1186, New Delhi Ridge

J. panduraefolia Andr. Bot. Rep. 4: t. 267, 1799; Haines, Bot. Bih. & Or. 2 : 102.

J. hastata Jacq. Enum. Pl. Carib. 32, 1760.

An erect, pretty, branched, small shrub. Leaves panduriform, distantly dentate below, abruptly acuminate. Flowers bright crimson, in long-peduncled, corymbose cymes.

Native of Cuba. Grown in gardens for ornament.

Flowers : Summer and rainy seasons

J. K. Maheshwari 361

Chrozophora Juss. corr. Benth. & Hook. f. nom. cons.

Erect herbs; ovaries and capsules clothed with stellate tomentum and silvery scales; stamens 5 *C. verbascifolia*

Prostrate herbs; ovaries and capsules clothed with stellate tomentum only; silvery scales absent; stamens 15, in 2 whorls:

Leaves about as long as broad, eglandular at the base *C. prostrata*

Leaves longer than broad, 2-glandular at the base ..

C. verbascifolia A. Juss. Euph. Tent. 28, 1824; Spreng. Syst. 3 : 851, 1826. *C. parvifolia*

An erect, scabrous, stout, deep-rooted, woolly-tomentose herb. Leaves 4.5-7 × 3.5 cm., ovate, entire or wavy. Flowers in short, terminal racemes; males crowded above; females below. Male flowers pale green; stamens 5. Capsules clothed with stellate hairs and silvery scales, 8 × 6 mm. Seeds black, wrinkled, glabrous.

A new record from Delhi State. Duthie in FUGP. 3 : 105 records this species from Mathura alone. Occurs near Hauz Khas on way to Mehrauli and in the neighbourhood of Najafgarh on sandy-loam soils. The plant gives a characteristic, dull bluish-white appearance from a distance.

Flowers and Fruits : May-Oct.
J. K. Maheshwari 335; 725

C. prostrata Dalz. in Dalz. & Gibs. Bomb. Fl. 233, 1861; FUGP. 3 : 106.
C. plicata forma 3 Hook. f. in FBI. 5 : 410, 1887.

A prostrate or procumbent, stellate-woolly herb, with many branches from the root. Leaves nearly as long as broad, often dark purplish-brown, eglandular at the base. Flowers unisexual, in few-flowered, axillary racemes. Stamens 15 in 2 whorls. Capsules stellate-woolly, without silvery scales, 6 × 5 mm.

Common in dried up ditches and canals, often forming a felt on the clayey ground.

Flowers and Fruits: May-June

C. parvifolia Klotz. ex Schwfth. Pl. Nilot. 11, 1862; Prain in Kew Bull. 91, 1918.

A prostrate, spreading or ascending, stellate-woolly, deep-rooted herb. Branches many, often tinged toward reddish. Leaves 2.5-5 × 2-4 cm., 2-glandular at base, often dark purplish-brown above and irregular in shape; veins impressed above. Flowers in short, axillary racemes. Male flowers vermilion-coloured. Anthers yellow. Capsules stellate-woolly without silvery scales, 6 × 5 mm. Seeds convex outside.

Grows in dried ditches and canals; common in the dried up bottom of Najafgarh Drain on clayey soil, associated with *Heliotropium supinum* Linn., and *Coldenia procumbens* Linn.

Flowers and Fruits : May-June
J. K. Maheshwari 677

Croton Linn.

C. bonplandianum Baill. in Adans. 4 : 339, 1864; Croizat in JBNHS. 41 :

573, 1940; *C. bonplandianus* (sphalm.) Muell.-Arg. in DC. Prodr. 15 (2) : 671, 1866.

C. sparsiflorum (*C. sparsiflorus* sphalm.) Morong. (sphalm. auct. Indic. 'Morung') in Ann. N.Y. Acad. Sci. 7 : 221, 1893 ; Haines, Bot. Bih. & Or. 2 : 105 ; Gamble, Fl. Pres. Mad. 2 : 1316.

For a correct name of this species, see Croizat (loc. cit.).

An erect, diffuse, much-branched annual, 30-90 cm. high. Stems clothed with multi-armed trichomes, becoming sympodial. Leaves simple, crowded towards the tops of branches, $4-6 \times 2-2.5$ cm., ovate-lanceolate, serrate, 2-glandular at the base. Inflorescence a terminal, erect, androgynous spike; female flowers below male ones. Male flowers pale white; stamens about 15. Female flowers with 2 extra-floral glands at the base of pedicels. Capsules 3-angled, roundish, stellate-hairy. Seeds shining, spongy, with a white cap, oblong.

A recently introduced weed in Delhi State. Native of S. America. Grows in abundance on fallow fields, dry unused lands, along roadsides, etc. It has spread in almost all the suburbs of Delhi. Met commonly along the railway lines especially near Nizamuddin.

Local name : Kala bhangra

Flowers and Fruits : June-Sept.

J. K. Maheshwari 229, Azadpur; 288, Okhla

Ricinus Linn.

R. communis Linn. Sp. Pl. 1007, 1753; Royle, Ill. 328; FBI. 5 : 457; Merr. Enum. 2 : 449; FUGP. 3 : 113; Parker, For. Fl. 461.

An evergreen shrub or small tree. Leaves palmately lobed, peltate. Flowers in branching racemes. Male flowers occupying the upper portion; stamens numerous. Capsules 3-lobed, echinate. Seeds 3, oblong, mottled.

Cultivated in private and public gardens; commonly planted in urban areas near habitations and fields.

Local name : Arand [castor]

Flowers and Fruits : Greater part of the year

J. K. Maheshwari 1003, Timarpur

Acalypha Linn.

Erect, mosaic-forming, green herbs; spontaneous *A. indica*
Erect shrubs; leaves mottled with red and purple; a garden shrub

. *A. wilkesiana*
A. indica Linn. Sp. Pl. 1003, 1753; Merr. op. cit. 446; FBI. 5 : 416; FUGP. 3 : 108.

An erect, herbaceous annual, 30-80 cm. high, with many spreading or ascending branches. Leaves membranous, 5×3.5 cm., ovate or rhomboid-

ovate, crenate-serrate, cuneate at base, arranged in a mosaic. Flowers minute, green, in lax, erect, axillary spikes; males clustered towards the top; females solitary or paired, each enclosed by a foliar, 5×5 mm. bract. Capsules concealed by persistent bracts. Seeds ovoid, pale brown, shining.

Common as a garden weed in the shades of trees and shrubs; also found in waste places near gardens and in cultivated fields.

Flowers and Fruits : Sept.-June
J. K. Maheshwari 79

A. wilkesiana Muell.-Arg. in DC. Prodr. 15: 817, 1866; Merr. loc. cit.; Bailey, Man. Cult. Pl. 622.

A. tricolor Seem. Fl. Vit. 225, 1867.

A garden shrub. Leaves usually broad cordate, short acuminate, crenate, variously mottled with shades of red and purple. Spikes slender, 20 cm. or more in length, in fascinating, drooping festoons. Flowers small, bright red.

A common garden favourite, planted for hedges and fences around gardens and parks. Varieties *marginata* W. Miller, and *macrophylla* N. Taylor, are also grown in similar places.

Flowers : Jan.-July

J. K. Maheshwari 206, Qudsia Gardens

Sapium P. Browne

S. sebiferum (Michx.) Roxb. Fl. Ind. 3 : 693, 1832; FBL. 5 : 470; FUGP. 3 : 116; Parker, For. Fl. 458.

Stillingia sebifera Michx. Fl. Bor.-Amer. 2 : 213, 1803; Royle, Ill. 328.

Excoecaria sebifera Muell.-Arg. in DC. Prodr. 15(2) : 1210, 1866; Brandis, For. Fl. 441.

A small, deciduous tree with a dense crown of foliage, branching above. Bark grey, longitudinally grooved. Leaves $4.5-7 \times 4-6.5$ cm., broad rhomboid, acuminate; base deltoid.

Native of China. Planted in lawns, parks and gardens. A number of trees occur in Sabzimandi Gardens. The tree bears a striking resemblance to *Dalbergia sissoo* Roxb., in its foliage and can be easily mistaken for the latter when in a vegetative condition.

English name : Chinese tallow-tree

J. K. Maheshwari 1119, Rashtrapati Bhavan Compound

Putranjiva Wall.

P. roxburghii Wall. Tent. Fl. Nepal. 61, 1826; Royle, Ill. 347, t. 83 bis; Brandis, For. Fl. 451, t. 53; FBL. 5 : 336; FUGP. 3 : 99.

A moderate-sized or large, evergreen tree. Branches drooping. Leaves obliquely elliptic-oblong to ovate, coriaceous. Flowers unisexual, yellow. Male flowers in dense, axillary clusters. Female flowers 1-3; stigmas large, fan-shaped. Drupes ellipsoid, hoary.

Commonly planted in the hedges, shrubberies and lawns of gardens. Self-sown, young plants are often met in waste places near gardens.

Local name : Pitrunjia

Male and female flowers : April-Aug. Fruits : Winter and summer seasons

J. K. Maheshwari 293; 1247

Securinega Juss. nom. cons.

Unarmed; leaves 2.5-7.5 cm. long *S. virosa*

Branchlets ending in spines; leaves usually not exceeding 2.5 cm. *S. leucopyrus*

S. virosa (Roxb. ex Willd.) Pax & Hoffm. in Engl. & Prantl, Nat. Pfam. (ed. 2) 19C: 60, 1931; Santapau in RBSI. 16(1): 275, 1953.

Phyllanthus virosus Roxb. ex Willd. Sp. Pl. 4 : 578, 1805.

Flueggea microcarpa Bl. Bijdr. 580, 1826; FBI. 5 : 328.

An erect, multi-branched, dioecious, unarmed shrub. Branches irregular, subhorizontal or ascending. Leaves 3.5-5.5 x 2-3 cm., variable in shape, usually obovate, otherwise elliptic, elliptic-ovate or obcordate, glaucous beneath. Flowers minute, greenish-yellow, in axillary clusters; the males numerous, stamens 5, exserted; females 1-5 or more. Fruits globose, of 2 sizes, white, fleshy. Seeds 3-6, punctate.

Occurs on the Ridge; planted in hedges and near canal banks. Some shrubs planted in Roshanara Gardens appear to be quite different than those found on the Ridge.

Male flowers : June-Aug.

J. K. Maheshwari 94 ; 1118

S. leucopyrus (Willd.) Muell.-Arg. in DC. Prodr. 15(2): 451, 1866; Pax & Hoffm. in Engl. & Prantl, Nat. Pfam. (ed. 2) 19C : 60 ; Santapau in RBSI. 16(1) : 275, 1953.

Flueggea (Fluggea) leucopyrus Willd. Sp. Pl. 4 : 757, 1806; FBI. 5 : 328; FUGP. 3 : 92.

Phyllanthus leucopyrus Koen. ex Roxb. Hort. Beng. 69, 1814, nom. nud. & Fl. Ind. 3 : 658, 1832.

A large, woody, much-branched, diffuse shrub. Branches white; branchlets spine-like, purplish when young. Leaves less than 2.5 x 1.5 cm., obovate, elliptic or obcordate, glaucous. Male flowers greenish-yellow, slender, pedicelled. Berries globose, white.

Uncommon; found on the Ridge and the neighbouring hilly tracts of Faridabad, in depressed areas. The male and female plants are often

seen together and form small, dense patches at some places; either by themselves or with *Grewia tenax* Fiori, and *Capparis separia* Linn. It grows on rocks also.

Flowers : July-Sept.

J. K. Maheshwari 210, Ridge; 721, near Gurukul (Faridabad)

Melanthesa Bl.

M. rhamnoides (Retz.) Bl. Bijdr. 591, 1826; Wt. Ic. t. 1898.

Phyllanthus rhamnoides Retz. Obs. 5 : 30, 1788.

Breynia rhamnoides Muell.-Arg. in DC. Prodr. 15 : 440, 1866.

A large shrub or small, glabrous tree. Branches many, horizontal. Branchlets flexuous, ascending, spreading. Leaves distichous, 2-4 × 1.5-2.5 cm., elliptic, glaucous beneath, turning black when dry; petiole bases easily detachable. Stipules subulate. Flowers greenish-yellow, solitary. Fruits globose, 6 × 6 mm., dull red or purple, fleshy, smooth. Introduced. Planted for ornamental hedges in gardens.

Flowers: Before and after rains

J. K. Maheshwari 1001, Nicholson Gardens

Phyllanthus Linn.

Filaments free; leaves oblong

P. simplex

Filaments united into a column:

Stipules peltate; leaves obovate, wedge-shaped at base

P. maderaspatensis

Stipules not peltate; leaves thin, oblong, the branching resembling pinnate leaf

P. fraternus

P. simplex Retz. Obs. 5 : 29, 1788; FBI. 5 : 295; Merr. Enum. 2 : 395; FUGP. 3 : 97.

An erect, prostrate or ascending, deep-rooted perennial, variable in appearance, much-branched from base, up to 45 cm. tall. Branches spreading. Leaves 10-20 × 4-7 mm., oblong to obovate, distichous. Stipules peltate. Female flowers numerous, solitary, borne below males. Capsules 3 × 3 mm., globose. Seeds trigonous.

An occasional weed in cultivated fields, growing on sandy and loamy soils. Also found on the Ridge amongst the boulders in moist soils.

Flowers and Fruits : July-Sept.

J. K. Maheshwari 1109, Shahdara; 1185, Ridge

P. maderaspatensis Linn. Sp. Pl. 982, 1753; FBI. 5 : 292; FUGP. 3 : 97.

An erect, glabrous herb. Leaves distant, 1-2.5 × 0.5-1 cm., usually cuneate-obovate, mucronate. Male flowers clustered; females solitary. Capsules depressed-globose, 3-lobed, 2.5 × 3 mm.

Rare.

Local name : Hazarmani

Flowers and Fruits : Sept.-Oct.

J. K. Maheshwari 770, Shahdara

P. fraternus Webster in Contr. Gray Herb. No. 176, 53, 1955.

P. niruri Hook. f. (non Linn.).

An erect, glabrous, shallow-rooted annual, 30-60 cm. high, often below 30 cm. Branches spreading. Leaves simple, appear to be compound, 10-17 × 4-9 mm., oblong, distichous, often overlapping. Flowers yellowish, axillary, hanging down below the branchlets; males 1-3; females solitary. Capsules depressed-globose, smooth. Seeds trigonous, pale brown, longitudinally ribbed.

A common weed of gardens and cultivated fields during the rainy season. Also found on the Ridge as a herbaceous undergrowth and in the crevices of stones.

Local name : Dhadhan; Mokh; Nunki

Flowers and Fruits : June-Oct.

J. K. Maheshwari 125

Kirganelia Juss.

K. reticulata (Poir.) Baill. Étud. Gén. Euph. 613, 1858; Haines, Bot. Bih. & Or. 129.

Phyllanthus reticulatus Poir. in Lamk. Encycl. 5 : 298, 1804; FBI. 5 : 288; FUGP. 3 : 95.

A large, diffuse or straggling, glabrous shrub. Branchlets drooping. Bark thin, greyish-brown. Leaves 2-4 × 1-2 cm., oblong, elliptic or rotundate, glabrous. Male flowers purplish, in fascicles; disk glands pale yellow; stamens 5. Female flowers solitary; ovaries 5 to 10-celled. Berries globose, 7 × 6 mm., dark purple, smooth. Seeds 10 or less, trigonous, crustaceous, punctate, shining.

Introduced; grown in the hedges of garden shrubberies, fruit orchards, etc. Often spontaneous along irrigation channels. It forms an effective hedge along with *Capparis septaria* Linn., and other shrubs. Used medicinally.

Local name : Neelbari; Makki

Flowers and Fruits : April-July

J. K. Maheshwari 180, Roshanara Gardens

Emblica Gaertn.

E. officinalis Gaertn. Fruct. 2 : 122, 1790; Wt. Ic. t. 1896; Santapau in RBSI. 16(1) : 277, 1953.

Phyllanthus emblica Linn. Sp. Pl. 982, 1753; FBI. 5 : 289.

A moderate-sized or large, deciduous tree. Bark peeling off in flakes. Leaves distichous, resembling pinnate leaves, linear. Flowers yellow, 12-18 x 3-4 mm., narrowly fleshy, globose, pale yellow. Native of tropical Asia.

Local name : Amla; Aonhla; Aola

Local name : Amla; Aonhla; Aola
Flowers : March-May

Flowers : March-May. Fruits : Cold season
J. K. Maheshwari 1190 Soft

J. K. Maheshwari 1190, Safdarjang Tomb

92. **Ulmaceae**

Flowers clustered, appearing before the leaves; fruit a samara

Flowers appearing on young, leafy shoots; fruit a drupe . . . *Holoptelea*
Celtis

Holoptelea Planch.

H. integrifolia (Roxb.) Planch. in Ann. Sc. Nat. (sér. 3) 10 : 259, 1848; FBI. 5 : 481; Wt. Ic. t. 1968; Parker, F. 1968.

FBI. 5 : 481; Wt. Ic. t. 1968; Parker, For. Fl. 466.
Ulmus integrifolia Roxb. Fl. G.

Ulmus integrifolia Roxb. Pl. Cor. 1 : 56, t. 78, 1798; Stewart, Punj. Pl. 211.

A small or medium-sized, deciduous tree. Bark grey. Leaves 10-15 × 5-7 cm., broad ovoid or ovate, acuminate, subcoriaceous. Flowers green, in numerous fascicles on the leafless branches. Samaras oblique-elliptic to suborbicular, about 2.5 × 2 cm., notched at the apex; wing reticulately veined.

Some trees occur on the Ridge near Lover's Lane, New Delhi and near Qutab. Also planted in gardens. The tree is leafless when fruiting. Stewart (loc. cit.) reports that the bruised leaves are applied to boils.

Local name : Papri

Fruits : May

J. K. Maheshwari 1191, Lodi Gardens

Celtis Linn.

C. australis Linn. Sp. Pl. 1043, 1753; Brandis, For. Fl. 428, t. 50 & Ind. Tr. 595; FBI. 5 : 482 ; FUGP. 3 : 121; Parker, For. Fl. 467.

A medium-sized, deciduous tree. Bark grey. Trunk more or less cylindrical. Leaves 6-8 × 3-4 cm., obliquely ovate or elliptic, acuminate, entire or crenate-serrate, coriaceous; juvenile ones soft. Flowers pale yellow, polygamous, apetalous; male and androgynous cymes usually at the base of the shoots, in lateral fascicles and short racemes; the females in the upper axils. Sepals with woolly margins, light purplish-tinged. Stamens 4, erect. Ovaries woolly; stigmas 2, large. Drupes ellipsoid or ovoid, rugose.

Planted in lawns and gardens for shade and fodder. The flowers and leaves appear simultaneously in March. The flowering period is very short and fruits are developed quickly.

Flowers : March-May. Fruits : June-Sept.

J. K. Maheshwari 631; 679, University Compound

93. Moraceae

Flowers crowded in globose heads or on or inside fleshy receptacles; stamens straight in bud :

Flowers crowded on the outside of oblong or irregularly globose, large receptacles *Artocarpus*

Flowers attached to the inner walls of a closed receptacle *Ficus*

Flowers not crowded on or inside large, fleshy receptacle, but in spikes or heads; stamens inflexed in bud with reversed anthers:

Flowers in catkins or the female flowers subcapitate ; perianth fleshy in fruit *Morus*

Male flowers in heads or spikes; females solitary or 2-4; perianth not fleshy in fruit *Streblus*

Artocarpus J. R. & G. Forst. nom. cons.

Fruit smooth, 5-10 cm. in diam., yellow, velvety *A. lakoocha*

Fruit tubercled, very large *A. heterophyllus*

A. lakoocha Roxb. Fl. Ind. 3: 524, 1832; Royle, Ill. 337; Brandis, For. Fl. 426 & Ind. Tr. 612; F.B.I. 5: 543; FUGP. 3: 141; Parker, For. Fl. 484.

An erect or bent, large, deciduous tree with a spreading crown. Bark fissured, dull black. Leaves large, 20-25 × 10-15 cm., elliptic, obovate or oblong, scabrous, entire or denticulate; stipules caducous. Flowers in axillary, glabrous, short-stalked heads. Male receptacles orange-yellow; flowers monandrous. Fruit clusters lobulate, nearly smooth, yellow when ripe. Achenes embedded in a fleshy receptacle.

Commonly cultivated in the Sabzimandi and Sarai Rohilla fruit orchards for its edible fruits, used either raw, cooked or as pickle.

Local name : Barhal

Flowers and Fruits : April-June

J. K. Maheshwari 1420, Gulab Bagh

A. heterophyllus Lamk. Encycl. 3: 210, 1789; Bailey, Man. Cult. Pl. 338.

A. integrifolius auct. (non Linn. f.).

A. integra auct. (non Merr.).

A fairly large, evergreen tree. Leaves elliptic to obovate, coriaceous,

10-20 x 10-13 cm. Stipules large, caducous. Male heads cylindric; females cylindric, tubercled and very large at maturity, hanging on the trunk and old branches. Seeds reniform.
Cultivated in the fruit orchards and elsewhere for the sake of its edible, large fruits.

Local name : Kathal

Flowers and Fruits : May-June

J. K. Maheshwari 1417, Gulab Bagh

Ficus Linn.

Leaves cupuliform .

Leaves not cupuliform, but broad ovate, elliptic, lanceolate to obovate : *F. krishnae*

Receptacles sessile :

Leaves tomentose or pubescent beneath, at least when young :

Leaves obtuse ; receptacles globose, puberulous, red when ripe *F. benghalensis*

Leaves shortly, abruptly acuminate ; receptacles oblong to subovate, nearly glabrous, orange-red when ripe *F. drupacea* var. *pubescens*

Leaves glabrous :

Lateral and secondary nerves close, fine and parallel ; receptacles always paired :

Receptacles bright orange-yellow ; lateral basal nerves of leaf spreading parallel to the secondary nerve *F. benjamina* var. *comosa*

Receptacles whitish or purplish ; lateral basal nerves oblique *F. microcarpa*

Lateral nerves not close and parallel :

Leaves acute or shortly, bluntly cuspidate *F. tsiela*

Leaves acuminate or caudate :

Leaves broad ovate or ovate-round :

Leaves terminating at the apex in a slender tail about half the length of the blade *F. religiosa*

Leaves not caudate, but narrowed at the apex into a cusp about one-fourth the length of the blade *F. rumphii*

Leaves ovate-oblong, elliptic or ovate, abruptly acuminate *F. virens* var. *sublanceolata*

Receptacles stalked :

Receptacles in clusters on short, special branches *F. glomerata*

Receptacles solitary or paired :

Medium-sized or large trees ; leaves ovate or oblong-ovate ; receptacles whitish, tinged red and dotted *F. virens* var. *virens*

Woody shrubs or small trees; leaves orbicular-ovate, entire or 3 to 5-lobed; receptacles yellow or yellowish purple when ripe:

Leaves usually broad or orbicular-ovate, sometimes lobed; branchlets tomentose *F. palmata*

Leaves generally lobed; branchlets pubescent or glabrous *F. carica*

F. krishnae C. DC. in Bot. Mag. t. 8092, 1906; Benthall, Trees Calc. 416.

A small or medium-sized tree, much-branched above the ground. Bark dull white. Trunk with distant, horizontal wrinkles. Leaves cupuliform, long-petioled, green above, pale yellow beneath, prominently nerved. Receptacles 1.5×1.4 cm.

Planted in gardens, lawns and squares.

English name: Krishna's buttercup

J. K. Maheshwari 1133

F. benghalensis Linn. Sp. Pl. 1059, 1753; Brandis, For. Fl. 412 & Ind. Tr. 600; FBI. 5: 499; FUGP. 3: 147; Santapau in RBSI. 16(1): 289, 1953.

F. indica Linn. Sp. Pl. 1060, 1753; emend. Lamk. Encycl. 2: 494, 1788 (non King, 1887).

A large, evergreen tree, extending laterally by sending down aerial roots from the branches. Leaves $12-15 \times 10-12$ cm., ovate, orbicular-ovate to elliptic, coriaceous, entire. Receptacles axillary, sessile, paired, globose, red.

Commonly planted along roadsides, in lawns and gardens. Young seedlings are often met in the crevices of the boundary walls of bungalows.

Local name: Bargad; Barh; Barota

Flowers: June-Sept.

J. K. Maheshwari 178

F. drupacea Thunb. var. *pubescens* (Roth) Corner in Gdns. Bull. Singapore 17: 381, 1960.

F. mysorensis var. *pubescens* Roth in Roem. & Schult. Syst. 1: 508, 1817.

F. mysorensis Heyne ex Roth, Nov. Pl. Sp. 390, 1821; FBI. 5: 500.

A handsome, shady tree with few aerial roots. Leaves $15-20 \times 9-11$ cm., ovate to ovate-elliptic, shortly abruptly acuminate, prominently nerved beneath. Receptacles sessile, in axillary pairs, 2.2×1.8 cm., oblong to subovate, nearly glabrous, orange-red when ripe.

Planted in public gardens and lawns.

F. benjamina Linn. var. *comosa* King, Sp. Fic. 44, 1887; Bailey, Stand. Cycl. Hort. 1233.

F. comosa Roxb. Pl. Cor. 2 : 14, t. 125, 1799.

A large, umbrageous, ornamental tree with a spreading crown and drooping branches. Leaves 6.2-12.5 × 2.5-6.2 cm., coriaceous, smooth, shining, elliptic-ovate, abruptly acuminate, obliquely pointed, entire. Receptacles axillary, solitary or paired, sessile, orange-yellow when ripe; male, female and gall flowers in the same receptacle. Achenes ovoid-reniform.

A graceful, evergreen tree; planted in gardens, lawns and squares. The receptacles become attractive at maturity.

Receptacles : Oct.

J. K. Maheshwari 736, Lodi Gardens

F. microcarpa Linn. f. Suppl. 442, 1781; Corner in Gdns. Bull. Singapore 17 : 397, 1960.

F. retusa auct. (non Linn.).

A large or medium-sized, evergreen, glabrous tree with a dense crown. Bark dark grey. Leaves 7.9 × 3.5-5 cm., elliptic, ovate or obovate, rounded or bluntly acuminate, polished, glossy; nerves not prominent. Receptacles about 6.9 × 6.9 mm., sessile, paired, depressed-globose, smooth, yellowish-reddish, subtended by 3, persistent bracts.

Commonly planted along with *F. virens* Ait. var. *virens*, and *F. virens* var. *sublanceolata* Corner, as an avenue tree, along several streets of New Delhi. Also planted in lawns and gardens. It provides an abundance of cool shade by its crown of dense foliage.

Receptacles : March-Oct.

J. K. Maheshwari 532

F. tsiela Roxb. Hort. Beng. 66, 1814, nom. nud. & Fl. Ind. 3 : 549, 1832; King, op. cit. 59, tt. 73, 84; FBI. 5 : 515.

A glabrous, spreading tree (stunted in the area) without aerial roots. Bark smooth, greenish-white. Leaves coriaceous, 10-14 × 6.5-8 cm., broad ovate, entire, smooth, with a thickened, marginal nerve; petioles one-third to half as long as the lamina. Receptacles crowded at the ends of branches, 13 × 10 mm., top-shaped, sessile, paired, smooth. Male flowers sessile; gall flowers pedicellate. Fruits ovate-reniform.

Planted in gardens, lawns and squares.

Receptacles : Oct.

J. K. Maheshwari 737

F. religiosa Linn. Sp. Pl. 1059, 1753; Royle, Ill. 337; Brandis, For. Fl. 415 & Ind. Tr. 601; King, op. cit. 55, t. 67 A; FBI. 5 : 513; Merr. Enum. 2 : 63; FUGP. 3 : 150; Santapau in RBSI. 16(1) : 291, 1953. *Urostigma religiosum* Gasp. Ric. Caprif. 82, t. 7, ff. 1-5, 1845; Wt. Ic. t. 1967.

A large or medium-sized, glabrous tree. Bark grey. Branches

without aerial roots. Leaves $10-15 \times 10-12$ cm., ovate-round, entire, coriaceous, shining; apex long-tailed. Receptacles sessile, paired, smooth, 10×8 mm., depressed-globose, dark purple when ripe.

Commonly planted along the roads that run parallel to the Jamuna River. Also met in villages near temples and as an avenue tree. New foliage, dark red and shining, appears about the middle of March. It is a sacred tree for Hindus. The insect found in the gall flowers of *F. religiosa* is a new species *Blastophaga quadraticeps*.

Local name : Pipal

Receptacles : April-June

J. K. Maheshwari 179

F. ramphii Bl. Bijdr. 437, 1825; King, Sp. Fic. 54, t. 670; FBI. 5 : 512; Brandis, Ind. Tr. 601 & 717; FUGP. 3 : 151; Santapau, op. cit. 293.

F. cordifolia Roxb. Fl. Ind. 3 : 548, 1832 (non Bl.); Brandis, For. Fl. 416, t. 48.

Urostigma cordifolium Miq. in Hook. Lond. Jour. Bot. 6 : 564, 1847.

A small or medium-sized, deciduous tree. Bark smooth, grey. Leaves glabrous, shining, $10-15 \times 8-10$ cm., broad ovate, acuminate. Receptacles sessile, paired, axillary, from old leaf scars, globular, 15×14 mm., smooth, whitish.

Planted in lawns and gardens.

Receptacles : May-June

F. glomerata Roxb. Pl. Cor. 2 : 13, t. 123, 1799 & Fl. Ind. 3 : 558; Royle, 111, 337; Brandis, For. Fl. 422, t. 49 & Ind. Tr. 609; King, Sp. Fic. 173, t. 218 A; FBI. 5 : 535; FUGP. 3 : 160; Santapau in RBSI. 16(1) : 293, 1953.

F. goolereea Roxb. Fl. Ind. 3 : 538, 1832.

Covellia glomerata Miq. in Hook. Lond. Jour. Bot. 7 : 465, 1848.

A small or medium-sized or large, deciduous tree. Bark smooth, dull white or reddish-brown. Trunk with distant horizontal lines, nearly circular. Leaves $10-15 \times 6-7$ cm., ovate, ovate-oblong to elliptic-lanceolate, glabrous, prominently nerved beneath. Stipules scarious, ovate-lanceolate. Receptacles clustered, on short, leafless branchlets, 2.4×2.5 cm., top-shaped to nearly globular, reddish, with a sweet flavour.

Planted in gardens and villages. The fruit is eaten raw or cooked. The leaves are much used as cattle fodder and frequently sold in the market. Planted along the Western Jamuna Canal, near village Bowana and along the Bodarpur-Mehrauli Road.

Local name : Gular

Receptacles : April-July

J. K. Maheshwari 16

F. virens Ait. Hort. Kew. 3 : 451, 1789 ; Corner in Gdns. Bull. Singapore 17 : 376, 1960.

F. infectoria Willd. sensu Roxb. Fl. Ind. 3 : 551, 1832 ; FBI. 5 : 515.

F. lacor auct. (non vera).

Var. *virens*

F. infectoria var. *lambertiana* King. Sp. Fic. 63, t. 76, 1887 ; FBI. 5 : 516.

It is distinguished chiefly by its pedunculate receptacles and coriaceous, broader leaves.

A common avenue tree along several streets in New Delhi. Also planted in gardens, lawns and squares for shade.

Local name : Pilkhan

Receptacles : Sept.-Dec.

J. K. Maheshwari 531, Queensway Avenue

Var. *sublanceolata* (Miq.) Corner in Gdns. Bull. Singapore 17 : 377, 1960.

F. saxophila Bl. var. *sublanceolata* Miq. in Ann. Mus. Bot. Lugd. Bat. 3 : 260, 1867.

A large or medium-sized, spreading, deciduous tree, quick-growing. Bark smooth, greenish-grey. Leaves thinly coriaceous, glabrous, 9-15 × 6-9 cm., ovate to ovate-oblong, abruptly acuminate, 3-nerved. Receptacles sessile, axillary, paired, pubescent, globose, whitish flushed with red, dotted when ripe.

Planted as an avenue tree along the streets of New Delhi.

Local name : Pilkhan

Receptacles : Oct.-Dec.

F. palmata Forsk. Fl. Aegypt.-Arab. 179, 1775 ; King, Sp. Fic. 146, t. 145 ; FBI. 5 : 530 ; Brandis, Ind. Tr. 607, 718 ; FUGP. 3 : 158.

F. caricoides Roxb. Fl. Ind. 3 : 529, 1832.

F. virgata Roxb. op. cit. 530 ; Royle, Ill. 337 ; Brandis, For. Fl. 419.

An erect, woody shrub or small tree, similar to the cultivated fig. Bark dull grey. Young parts tomentose. Leaves 10-15 × 8-11 cm., orbicular or broad ovate, usually dentate or serrate ; base 3-nerved. Receptacles axillary, solitary, pubescent, about 2 × 1.5 cm., subglobose or pyriform, yellow.

Common in hedges and along irrigation channels passing through the fruit orchards. Also found in waste places near gardens, etc. The latex is said to be employed in preparation of curd.

Local name : Anjiri ; Kaimbar ; Khat guleri ; Patguleri

Receptacles : Feb.-July

J. K. Maheshwari 81, Roshanara Gardens ; 527 ; 838, near Qutab

F. carica Linn. Sp. Pl. 1059, 1753 ; Parker, For. Fl. 482 ; Merr. Enum. 2 : 47 ; Bailey, Man. Cult. Pl. 339.

A small tree or bush, branching from the base. Bark smooth, grey or dull white. Trunk with distant, horizontal wrinkles. Leaves about 20×18 cm., broad ovate to nearly orbicular or 3 to 5-lobed, cordate, crenate-serrate. Receptacles solitary or paired, axillary, about 2.5×2.2 cm., globose or pear-shaped, yellowish-purple when ripe.

Native of Mediterranean Region. Cultivated in gardens for its edible figs.

Local name : Phakwada ; Anjir

Receptacles : Jan.-April. Ripe Figs : June-Oct.

J. K. Maheshwari 586, Kingsway Camp Gardens

F. elastica Roxb. Hort. Beng. 65, 1814, nom. nud. & Fl. Ind. 3 : 541, 1832 ; FBL 5 : 508 ; King, op. cit. 45, t. 54 ; Santapau in RBSI. 16(1) : 294, 1953.

A small or medium-sized, glabrous, evergreen tree. Leaves $15-18 \times 7-8.5$ cm., usually elliptic, deep glossy-green. Stipules about half as long as lamina. Receptacles paired in old axils, sessile.

Grown in its juvenile state as a pot- or tub-plant in gardens, green-houses and living rooms.

J. K. Maheshwari 1436

Morus Linn.

Leaves acute ; styles short, free, glabrous or slightly hairy . *M. alba*
Leaves long-acuminate ; styles long, hairy, connate below . *M. indica*

M. alba Linn. Sp. Pl. 986, 1753 ; Royle, Ill. 336 ; Roxb. Fl. Ind. 3 : 594 ; Brandis, For. Fl. 407, t. 47 & Ind. Tr. 612 ; FBL 5 : 492 ; Parker, For. Fl. 473 ; FUGP. 3 : 137 ; Merr. Enum. 2 : 36.

A small or medium-sized, deciduous tree. Leaves broad ovate, dentate or lobed, cordate. Flowers monoecious. Male spikes catkin-like, elongate. Female spikes short, ovoid. Fruits white or dark purple, turning black when ripe, sweet.

Cultivated in gardens, lawns and hedges, for its edible catkins. The young leaves and flowers appear in February. Leaves are used as fodder. Common on the Grand Trunk Road as a roadside tree.

Local name : Toot

Flowers : Feb.-March. Fruits : May-June

J. K. Maheshwari 645 ; 968 ; 1015 ; 1230

M. indica Linn. Sp. Pl. 986, 1753 ; Brandis, For. Fl. 408 & Ind. Tr. 612 ; FBL 5 : 492 ; FUGP. 3 : 136.

A deciduous tree or large shrub. Leaves ovate, coarsely serrate, 4-15 cm. long. Male spikes lax. Female spikes short, ovoid. Fruits dark purple at maturity.

Cultivated in gardens for its fruits.

Local name : Shehtut
Flowers and Fruits : Feb.-May

Streblus Lour.

S. asper Lour. Fl. Cochinch. 2 : 615, 1790 ; Brandis, For. Fl. 410 & Ind. Tr. 615 ; FBI. 5 : 489 ; Merr. Enum. 2 : 38 ; FUGP. 3 : 139 ; Parker, op. cit. 483.
Trophis aspera Retz. Obs. 5 : 30, 1788 (excl. syn.) ; Roxb. Fl. Ind. 3 : 761.

A small, often gnarled, evergreen tree, up to 6 m. high, sometimes a shrub, branching from base. Bark whitish. Branches erect, leafy. Leaves elliptic or rhomboid or obovate, acute or acuminate, rough ; margins subcrenate.

Rare ; met in the hilly tracts near Gurukul, Faridabad and along railway lines. The flowers and fruits could not be observed. Goats like this plant. Also used in skin diseases.

Local name : Choriya ; Papai
J. K. Maheshwari 716 ; 812

Broussonetia papyrifera Vent. Tabl. Regn. Végét. 3 : 547, 1799 ; Royle, Ill. 340 ; Brandis, For. Fl. 410 & Ind. Tr. 613 ; FBI. 5 : 490 ; FUGP. 3 : 162.

A small, quick-growing, spreading tree. Branchlets tomentose. Leaves rather sticky, 3-nerved, obliquely ovate or oblong, entire or lobed, serrate. Flowers dioecious. Male spikes cylindric, peduncled.

Planted.

Male flowers : Feb.-April
J. K. Maheshwari 1385

94. Cannabinaceae (Cannabiaceae)

Cannabis Linn.

C. sativa Linn. Sp. Pl. 1027, 1753 ; FBI. 5 : 487 ; FUGP. 3 : 124 ; Santapau in RBSI. 16(1) : 295, 1953.

A robust, herbaceous or shrubby, smelling annual. Leaves 3 to 8-foliolate, long-petioled ; lobes lanceolate. Flowers dioecious. Male plants : flowers in axillary, short paniced cymes. Female plants : flowers crowded with leafy bracts. Style arms 2, filiform. Nuts crustaceous.

Common in waste grounds, along roadsides and in the undergrowth of fruit orchards near Sabzimandi and Sarai Rohilla, often becoming gregarious along the edges of fields and irrigation channels of gardens. The male plants are found more commonly than the female plants.

Local name : Bhang
 Flowers and Fruits : Cold season
 J. K. Maheshwari 48, Timarpur

95. Casuarinaceae

Casuarina Linn.

C. equisetifolia Linn. Amoen. Acad. 4 : 143, 1759 ('*equisetifolia*'); FBL. 5 : 598 ; Merr. Enum. 2 : 1 ; FUGP. 3 : 162 ; Santapau. RBSI. 16(1) : 295, 1953. *C. muricata* Roxb. Fl. Ind. 3 : 519, 1832.

A narrow, tall, leafless, weak tree. Branches drooping. Branchlets very slender, rush-like, with whorls of 6-8 scales, similar to the twigs of *Equisetum* (hence the name *equisetifolia*). Male spikes cylindric, 2.5×0.4 cm., usually numerous at the ends of branches. Female flowers in globose or ovoid, 2.5×1.8 cm. heads becoming cone-like. Nutlets thin, winged.

Planted as an avenue tree along some streets ; one can be seen behind High Transmitter Power Station, Coronation Memorial, Radio Colony. Also planted in lawns and gardens. It is not suitable as an avenue tree.

Local name : Vilayti jhau
 Flowers : March-May. Fruits : June-July
 J. K. Maheshwari 196

96. Salicaceae

Salix Linn.

S. tetrasperma Roxb. Pl. Cor. 1 : 66, t. 97, 1798 & Fl. Ind. 3 : 573, 1832 ; Royle, Ill. 343 ; Brandis, For. Fl. 462, t. 58 & Ind. Tr. 636 ; FBL. 5 : 626 ; Merr. Enum. 2 : 22 ; FUGP. 3 : 166 ; Santapau in RBSI. 16(1) : 296, 1953.

A large, much-branched, leafy shrub or small tree. Bark rough. Leaves $8-15 \times 3.5-4.5$ cm., ovate-lanceolate to lanceolate, glaucous beneath, serrulate. Flowers after the leaves. Male catkins $5-10 \times 1-1.5$ cm., yellow, scented.

Common along the banks of Okhla and Hindan Canals, probably planted. The male plants are propagated by cuttings which possess dormant buds. Female plants are found near Aligarh but not in Delhi.

Male flowers : Nov.-March
 J. K. Maheshwari 552

97. Ceratophyllaceae

Ceratophyllum Linn.

C. demersum Linn. Sp. Pl. 992, 1753; FBI. 5: 639; Merr. Enum. 2: 141; FUGP. 3: 168; Santapau in RBSI. 16(1): 296, 1953.
C. verticillatum Roxb. Fl. Ind. 3: 624, 1832.

A slender, submerged, rootless, much-branched aquatic. Leaves whorled, divided into filiform, brittle, serrate segments. Male and female flowers solitary. Nutlets ovoid or ellipsoid, coriaceous, small, the persistent, subulate style subtended by a short, basal spine on either side. Common in the still water of ponds, ditches or shallow canals.

Flowers and Fruits : After rains

J. K. Maheshwari 195; 267

CLASS II. MONOCOTYLEDONES

98. Hydrocharitaceae

Leafy, branched herbs with stems; leaves small *Hydrilla*
 Stemless, stoloniferous herbs; leaves long, ribbon-like *Vallisneria*

Hydrilla Rich.

H. verticillata (Linn. f.) Royle, Ill. 376, 1839; FBI. 5: 659; Merr. Enum. 1: 26; FUGP. 3: 173.

Serpicula verticillata Linn. f. Suppl. 416, 1788.

Vallisneria verticillata Roxb. Fl. Ind. 3: 751, 1832.

A slender, leafy, submerged, freshwater herb, appearing like *Elodea canadensis* Michx., and forming large masses. Leaves opposite or whorled, oblong-linear to linear, apiculate, spreading in water. Male flowers pedicellate, solitary, in a spathe; females sessile.

Common and abundant in still or slowly running water of ponds, ditches and canals.

Flowers : Sept.-Nov.

J. K. Maheshwari 503

Vallisneria Linn.

V. spiralis Linn. Sp. Pl. 1015, 1753; FBI. 5: 660; FUGP. 3: 174; Bailey, Man. Cult. Pl. 132; Santapau in RBSI. 16(1): 297, 1953.

A submerged, tufted, dioecious perennial, at the muddy bottom of water. Leaves radical, up to 40 x 1 cm., linear, erect. Male flowers several, minute, in short-stalked spathes, floating to the surface at

anthesis. Female flowers solitary, on a very long, flexuous or spiral, leafless scape which gets coiled after pollination.

Common at the bottom of ponds, ditches and canals.

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 554

99. Orchidaceae

Zeuxine Lindl. corr. Roep.

Z. strateumatica (Linn.) Schltr. Orch. Deutsch. N. Guin. 77, 1911; Holttum, Fl. Mal. 1 : 131.

Orchis strateumatica Linn. Sp. Pl. 943, 1753.

Zeuxine sulcata Lindl. Gen. & Sp. Orch. 485, 1840; FBI. 6 : 106.

A small, terrestrial herb, usually 5-10 cm. tall. Leaves 5-10 × 0.4 cm., linear, acuminate, passing into linear bracts. Flowers pink, in densely flowered, 2-5 × 1 cm. racemes. Bracts ovate-lanceolate, acuminate, much longer than the ovary. Petals forming with the dorsal sepal a hood to the column. Capsules ellipsoid.

Rare. Collected in a flowering state from the moist, turfy ground behind the Botany Division, I.A.R.I., and along the 'bunds' of fields near village Gheora. Often escapes notice due to its small size and its being hidden amongst the grasses.

Flowers : Feb.-March

J. K. Maheshwari 1409

100. Musaceae

Musa Linn.

M. paradisiaca Linn. Sp. Pl. 1043, 1753; Moore in Bailey 5 : 185, 1957.

M. paradisiaca Linn. subsp. *sapientum* (Linn.) K. Schum. in Pfreich. 4(45) : 20, 1900; Cooke, Fl. Pres. Bomb. 2 : 742.

M. paradisiaca Linn. var. *sapientum* Kuntze, Rev. Gen. 2 : 692, 1891; Bailey, Man. Cult. Pl. 286.

M. sapientum Linn. Syst. 1303, 1759; FBI. 6 : 262.

A stoloniferous plant, 2.5-3.6 m. tall. Leaves large, oblong, erect or ascending. Spikes drooping, about as long as the leaves. Bracts many-flowered, deciduous. Flowers 60 × 7 mm. Fruits oblong, yellowish-green when ripe, sweet, edible. Seeds brownish-black (if present).

Planted by suckers in fruit orchards and garden shrubberies near houses on moist soil. It grows well in Delhi and is used as vegetable. The stems and flowers are also eaten after cooking. Once planted, it requires little care.

Local name : Kela
 Flowers : April-June. Fruits : Rainy season
 J. K. Maheshwari 228

101. Zingiberaceae

Anther filament elongated ; inflorescence not cone-like . . . *Alpinia*
 Anther filament short ; inflorescence cone-like . . . *Zingiber*

Alpinia Roxb. nom. cons.

A. speciosa (Wendl.) K. Schum. Fl. Kaiser-Wilhelmsl. 29, 1887 & in Bot. Jahrb. 15 : 418, 1893; Bailey, Man. Cult. Pl. 289.

Zerumbet speciosum Wendl. Sert. Hanov. 4 : 3, t. 19, 1798.

Alpinia nutans Roscoe in Sm. Exot. Bot. 2 : 93, t. 106, 1805 & in TLS. 8 : 346, 1807.

An erect, leafy shrub, 1-2 m. tall. Leaves large, oblong-lanceolate, glabrous, shining. Flowers white, tinged with rosy or purplish, fragrant, 3 × 1.5 cm., in 15-30 cm. long, terminal thyrses, at length nodding. Bracts large, white. Calyx cylindric, 3-toothed. Stamen 1, white. Staminodes 2. Ovaries embedded in a densely hairy torus.

One of the loveliest ornamentals with a striking, piquant odour in leaves and flowers. Planted in the hedges of Rajghat, Safdarjang Tomb and other public parks and fruit orchards.

Local name : Elaichi
 Flowers : March-May
 J. K. Maheshwari 652

Zingiber Boehm. nom. cons.

Z. officinale Roscoe in TLS. 8 : 358, 1807; Duthie & Fuller, Field & Gard. Crops 3 : 47, t. 100; Bailey, Man. Cult. Pl. 288.

A herb with a thick, tuberous, aromatic rootstock. Stems leafy, about 1 m. high. Leaves linear-lanceolate to lanceolate, sessile, sheathing at the base.

Cultivated for the rhizome which provides ginger.

Local name : Adrak
 J. K. Maheshwari 1451

102. Amaryllidaceae

Crinum Linn.

C. defixum Ker-Gawl. in Quart. Jour. Sci. 3 : 105, 1817; FBl. 6 : 281; FUGP. 3 : 248; Prain, Beng. Pl. 1061; Cooke, Fl. Pres. Bomb. 2 : 749.

C. asiaticum Roxb. Fl. Ind. 2 : 127, 1832 (non Linn.).
A stout, leafy herb or undershrub. Leaves erect, linear, concave,
large. Flowers white, large, in umbels on a long, stout scape. Perianth
tube equalling the spreading, linear or linear-lanceolate lobes. Filaments
free. Anthers linear. Fruits subglobose.

Commonly planted in hedges around gardens, near temples, etc.

Local name : Sukhdarshan

Flowers : Oct.-Dec.

J. K. Maheshwari 853

103. Agavaceae

| | |
|--------------------------------------|--------------|
| Leaves usually spine-edged | <i>Agave</i> |
| Leaves mostly entire | <i>Yucca</i> |

Agave Linn.

Leaves in a close globose rosette, never exceeding 90 cm. in length *A. wightii*

Leaves in a lax rosette or tufted, never less than 90 cm. in length *A. mexicana*

A. wightii Dr. & Prain in Agric. Ledger 13(7) : 91, 1906 (sub litt. J); FUGP.
3 : 244; Parker, For. Fl. 512.

Trunk stout, usually conspicuous. Leaves ensiform, linear-lanceolate,
up to 100 × 10 cm., many, forming a stiff rosette; marginal prickles spread-
ing or erect, with a small, brown cushion, sharply recurved and parallel
to the leaf edge; terminal spine pale, decurrent.

Commonly planted as a hedge along the 'bunds' of gardens.

A. mexicana Dr. & Prain in Agric. Ledger 13 (7) : 88, 1906 (sub litt. F);
FUGP. 3 : 243.

Duthie in FUGP. (loc. cit.) records this species in the arid strip
between Gwalior and Delhi under *A. cantala*. Apparently it is the first
Agave to reach India from the Pacific coast of C. America.

Yucca Linn.

Y. gloriosa Linn. Sp. Pl. 319, 1753; Bailey, Man. Cult. Pl. 241.

A stemless or shortly trunked plant. Leaves 60-75 × 2 cm., entire,
yellow-edged, mostly clustered in rosettes at surface of ground, flat with
margins raised; apices needle-pointed, red. Inflorescence an erect, long
panicle with alternate branches, usually overtopping the leaves. Flowers
greenish-white, produced in profusion on a solitary, central scape, droop-
ing, bell-shaped, hermaphrodite. Perianth lobes waxy in texture. Stam-
ens 6, embracing the ovary. Styles connate forming a central canal;
stigmas 3, each bilobed and forming a stigmatic chamber below.

The plant is of great botanical interest. It flowers only at intervals of several years. It has been planted on rockeries of public and private gardens.

Flowers : March; August
J. K. Maheshwari 1435

104. Dioscoreaceae

Dioscorea Linn.

D. bulbifera Linn. Sp. Pl. 1033, 1753; Santapau in JBNHS, 49: 628, 1950.
D. sativa Thunb. Fl. Jap. 151, 1784; FBL 6: 295 (excl. *D. cliffortiana* auct., non Linn.).

A climbing, herbaceous perennial with long, tuberous roots. Leaves ovate, cordate, acuminate, alternate. Stems with small, globular tubers, twining to the left.

Cultivated on a small scale in gardens for its tubers which are eaten as vegetable. A variety, said to be grown in Delhi, ripens its tubers after one year.

Local name : Ratalu
J. K. Maheshwari 1449

105. Liliaceae

Plants with thorn-edged, basal rosettes of succulent leaves . . . *Aloe*
Plants not as above :

Habit climbing or straggling; leaves absent; stems modified into linear or needle-shaped leaves (cladodes) . . . *Asparagus*

Habit erect; leaves normal :

Flowers in heads or umbels on long scapes; cultigens . . . *Allium*

Flowers racemose; plants wild :

Bulbiferous herbs; leaves appearing after the flowers . . . *Urginea*

Non-bulbiferous herbs; leaves and flowers contemporary . . . *Asphodelus*

Aloë Linn.

A. barbadensis Mill. Gard. Dict. n. 2, 1768.

A. perfoliata var. *vera* Linn. Sp. Pl. 320, 1753.

A. vera (Linn.) Webb & Berth. (non Mill.).

Nearly acaulescent, stoloniferous plant; the leaf rosettes arising from the ground, up to 60 cm. high. Leaves erect, numerous, thick, glaucous-

green, lanceolate, long-acuminate, thorn-edged. Flowers vermilion-coloured, in simple, erect racemes, the lower flowers falling off as the raceme elongates. Stamens equalling the perianth.

Grown in gardens as a bed- or pot-plant for its peculiar foliage.

Flowers : March-April

J. K. Maheshwari 966

Asparagus Linn.

A. racemosus Willd. Sp. Pl. 2 : 152, 1799; FBI. 6 : 316; FUGP. 3 : 259; Parker, For. Fl. 520.

A straggling or scandent, much-branched, spinous herb or shrub. Stems woody, grey-white. Spines suberect or subrecurved. Cladodes 2-6 together, narrowly oblong-linear, falcate. Flowers small, white, in solitary or fascicled, simple or branched racemes. Berries globose, produced when leafless.

Wild on the Ridge as well as in the neighbouring hilly tracts of Gurgaon. The plant was observed to produce abundant fruit near Gurukul (Faridabad).

Local name : Satawar ; Phusar

Flowers : During rains. Fruits : Cold season

J. K. Maheshwari 215; 824

Allium Linn.

Leaves cylindric and usually fistular

Leaves plane, flat or keeled, not hollow :

Bulbs long, cylindric, simple; heads bearing flowers only

Bulbs short, compound; heads bearing both flowers and bulbils

.

A. cepa Linn. Sp. Pl. 300, 1753; FBI. 6 : 337; FUGP. 3 : 267.

Bulbs large. Leaves radical, hollow, bifarious. Flowers many, white, in dense umbels with both flowers and bulbils, subtended by 2 or 3 reflexed bracts. Stamens exerted.

Cultivated as a cold season crop in some parts of the district.

Local name : Piyaz; English name : Onion

Flowers : Nov.-Feb.

J. K. Maheshwari 1076

A. porrum Linn. Sp. Pl. 295, 1753; Bailey, Man. Cult. Pl. 246.

A. ampeloprasum Linn. Sp. Pl. 294, 1753; FBI. 6 : 337; FUGP. 3 : 267.

A stout, tall plant. Bulbs long, cylindric, simple. Leaves flat, keeled.

Flowers many, pinkish, in dense, terminal umbels. Anthers exserted; filaments 2-toothed.

Cultivated during the cold season for its elongated bulbs.

English name : Leek

Flowers : Cold season

J. K. Maheshwari, cultivated in gardens

A. sativum Linn. Sp. Pl. 296, 1753; FBI. 6 : 337; FUGP. 3 : 268.

Bulbs short, with bulblets enclosed in a white or pink envelope. Leaves flat. Flowers often displaced by bulbils, pinkish, in lax umbels on a long, terete scape exceeding the leaves. Anthers and style exserted.

Cultivated during the cold season.

Local name : Lahsan; Lasun ; English name : Garlic

J. K. Maheshwari 1452

Urginea Stein.

U. indica (Roxb.) Kunth, Enum. 4 : 333, 1843; FBI. 6 : 347; FUGP. 3 : 264; Santapau in RBSI. 16(1) : 322, 1953.

Scilla indica Roxb. Fl. Ind. 2 : 147, 1832.

A bulbiferous herb. Bulbs 6-8 × 4-6 cm., ovoid. Leaves appearing after the flowers, radical, linear, acute, nearly flat, spreading on the ground. Flowers pale brown, 12 × 5 mm., distant, drooping or spreading, in long, erect, brittle scapes, caducous, when leafless. Capsules oblong, triquetrous, loculicidal. Seeds black, margined, 6 × 3.5 mm.

Uncommon; found on the Ridge in small patches amongst stones or on gravelly soil in open places or shade of shrubs. The flowers appear during the hot summer months, followed by leaves during the monsoon period. The bulbs possess cardiac stimulant and diuretic properties.

The plant reported by Col. C. T. Bamber from Delhi (in Plants of the Punjab, p. 441, 1916) as *Dipcadi montanum* appears to be the above species from its description.

Local name : Jangli piyaz

Flowers and Fruits : March-May

J. K. Maheshwari 1080, Old Delhi Ridge

Asphodelus Linn.

A. tenuifolius Cav. in An. Cienc. Nat. 3 : 46, t. 27, f. 2, 1801; FBI. 5 : 332; FUGP. 3 : 265.

An annual, stemless herb, variable in size. Leaves 15-40 × 3-5 cm., terete, hollow. Scapes several, simple or branched in the upper part, 30-60 × 1 cm. Flowers whitish, in lax racemes. Bracts broad ovate. Perianth lobes oblong. Capsules globose, loculicidal. Seeds black, rugose.

A common winter weed of cultivation in moist localities. Also found in moist, waste and unused ground.

Local name : Piazl

Flowers and Fruits : Jan.-June

J. K. Maheshwari 1077

106. Smilacaceae

Smilax Linn.

S. prolifera Roxb. Fl. Ind. 3 : 795, 1832; F.B.I. 6 : 312; Brandis, Ind. Tr. 641; FUGP. 3 : 261.

S. laurifolia Roxb. Fl. Ind. 3 : 793, 1832.

A stout, climbing, prickly shrub with tendrils. Leaves variable, 10-15 × 7-10 cm., oblong-ovate to orbicular, coriaceous, 3 to 7-nerved; petiole with an amplexicaul, auriculate sheath at the base. Flowers white, dioecious, in 10 or more, many-flowered, about 1.5 × 1.5 cm. umbels.

Grown as an ornamental along the outer walls of gardens or along poles, etc. The flowers usually fall off without producing fruits.

Flowers : Jan.-March

J. K. Maheshwari 1078, Mughal Gardens

107. Pontederiaceae

Petioles swollen into floats; perianth tubular below; anther filaments not horned *Eichhornia*

Petioles not enlarged to form floats; perianth segments free; filament of one larger anther horned on one side *Monochoria*

Eichhornia Kunth nom. cons.

E. crassipes (Mart.) Solms in DC. Mon. Phan. 4 : 527, 1882; Merr. Enum. 1 : 200; Haines, Bot. Bih. & Or. 1102.

Pontederia crassipes Mart. Nov. Gen. Sp. Pl. 1 : 9, t. 4, 1823.

A floating aquatic, profusely rooting at the nodes. Leaves rosette-forming, spatulate or paddle-shaped; petioles swollen into green bladders. Flowers violet-blue, in many-flowered spikes. Ovaries 3-celled. Ovules numerous.

A beautiful plant introduced from America. Common during the monsoon period in Hindan River, Najafgarh Canal and other ponds.

English name : Bengal terror; Water-hyacinth

Flowers and Fruits : Sept.-Nov.

J. K. Maheshwari 546

Monochoria Presl**Monochoria sp. (*vaginalis* Presl ?)**

An amphibious herb, 30-100 cm. high. Leaves ovate to ovate-lanceolate, 6-13 × 2.5-5 cm., usually acuminate. Flowers white, in rather dense racemes; peduncles emerging from the sheaths of upper leaves; pedicels in fruits up to 2.5 cm., long. Perianth lobes 6, pale green on the outside. Filaments of large anther with an acute process on one side. Fruits about 1 cm. long, oblong. Seeds ovoid, many-ribbed.

A weed in the inundated rice fields, water marshes and muddy soils of the Najafgarh Drain, often in association with *Sagittaria guayanensis* H. B. & K., *Nymphaea nouchali* Burm. f., and *Sphenoclea zeylanica* Gaertn.

Local name : Piazi; Panighas
Flowers and Fruits : Sept.-Oct.
J. K. Maheshwari 450; 1324

108. Commelinaceae

Perfect stamens 3; cymes enclosed in spathaceous bracts

Perfect stamens 6; ocreate leaf sheaths flower-bearing *Commelina*
Cyanotis

Commelina Linn.

All the cells of the ovary 1-ovuled; seeds smooth *C. kurzii*

The two anticus cells of the ovary 2-ovuled, the posticus 1-ovuled :

Leaves usually ovate, broader; seeds rugose *C. benghalensis*

Leaves lanceolate, narrower; seeds smooth, truncate at one end:

Spathes broad ovate; ovary 5-ovuled but capsules usually 3-seeded,
posticus cell not keeled *C. forskalii*

Spathes ovate-lanceolate; capsules usually 5-seeded, posticus
cell keeled *C. hasskarlii*

C. kurzii Cl. in JLS. 11 : 444, 1871; Barnes in JBNHS. 46 : 87, 1946.

A straggling or erect, tall herb, 60-90 cm. tall. Leaves 10-15 × 2-3 cm., variable, lanceolate, scabrous or villous; sheaths 2.5 cm. long, the mouth bearded. Spathes sessile, 2-2.5 × 1.5-2 cm., nearly as broad as long, crowded in terminal heads, scabrous. Flowers violet-blue. Capsules 3-celled; cells 1-seeded. Seeds smooth, lead-coloured.

Found in moist, shady places of gardens and lawns. Also occurs in the hilly plateaus, spreading upon rocks and growing in the crevices of stones.

Flowers and Fruits : Aug.-Oct.
J. K. Maheshwari 298, Roshanara Gardens

C. benghalensis Linn. Sp. Pl. 41, 1753; FBI. 6 : 370; FUGP. 3 : 274; Merr. Enum. 1 : 195.

A branched, diffuse or straggling herb with dimorphic flowers, creeping and rooting below. Leaves ovate to oblong, broader, obtuse, rounded, cuneate or cordate at the base. Aerial spathes 1-3 in the axils, obconic, funnel-shaped or turbinate. Aerial flowers sky-blue to bluish-violet. Capsules 5-seeded. Seeds wrinkled, pitted. Underground flowers bisexual, usually solitary in a pear-shaped spathe.

A common rainy season annual on the Ridge as well as in fields, gardens and waste places, on moist, shady situations. Used in skin inflammations and as fodder. The young leaves are eaten as vegetable.

Local name : Kanteri; Kanvo; Kankawwa; Kana

Flowers and Fruits : June-Nov.

J. K. Maheshwari 131; 521

C. forskalii Vahl, Enum. 2 : 172, 1806; FBI. 6 : 371.

A diffuse, branched, creeping or straggling herb with aerial chasmogamous and underground cleistogamous flowers, rooting at the nodes. Leaves linear or narrowly oblong, often undulate. Aerial spathes axillary, 3 to 5-flowered; flowers sky-blue. Capsules usually 3-seeded. Seeds smooth, subglobose. Cleistogamous flowers usually solitary in a spathe, bisexual, reduced. Capsules usually 1-seeded.

Apparently a new record from the north Indian plains. Common on the Ridge in sandy depressions, amongst stones, in the shades of shrubs, etc. becoming abundant in local patches. Also found in fields, gardens and waste places. Common around Najafgarh village on damp, sandy soil and in hedges along 'bunds' of fields. Easily distinguished from *C. benghalensis* Linn., by its linear leaves and smooth seeds. Used as cattle fodder and as vegetable.

Local name : Kankawwa ; Kana

Flowers and Fruits : Aug.-Nov.

J. K. Maheshwari 432; 1050

C. hasskarlii Cl. Comm. & Cyrt. Beng. 13, t. 5, 1874 & in DC. Mon. Phan. 3 : 157; FBI. 6 : 370; FUGP. 3 : 273.

The occurrence of this plant is included on the authority of Duthie in FUGP. (loc. cit.) who records it from Delhi to N. Oudh.

A glabrous or pubescent, much-branched herb. Leaves narrowly lanceolate. Spathes axillary, ovate-lanceolate, cordate at the base. Flowers in pubescent, unequal cymes, the lower branch 1 to 2-flowered, upper 2 to 4-flowered. Capsules quadrate, apiculate. Seeds cylindric.

Cyanotis D. Don nom. cons.

C. axillaris Schult. f. Syst. 7 : 1154, 1830; FBI. 6 : 388; FUGP. 3 : 280.
Tradescantia axillaris Linn. Mant. 321, 1771.

A trailing or erect, diffusely branched, fibrous-rooted annual. Leaves narrowly linear or linear-lanceolate, acute or acuminate, flat; ocreate sheaths inflated, flower-bearing. Flowers pinkish-blue, in cymes reduced to axillary fascicles in the inflated sheaths. Capsules oblong-ellipsoid, beaked.

Rare in the area. Met only in damp, swampy soils of trans-Jamuna tracts, near Jamuna Bridge in waste, open places or under shade.

Flowers and Fruits : Oct.-Dec.

J. K. Maheshwari 1000

109. Juncaceae

Juncus Linn.

J. bufonius Linn. Sp. Pl. 328, 1753; Royle, III, 401; FBI, 6: 392; Merr. Enum. 1 : 201; FUGP, 3 : 282.

A slender, small, tufted annual up to 25 cm. high, dichotomously branched. Leaves chiefly radical, grass-like. Flowers pale green, solitary and in scattered, few-flowered cymes; laterals 6-androus and terminal 3-androus. Tepals with membranous margins. Capsules obovoid, embraced by the perianth. Seeds numerous, very minute, finely reticulate.

A winter herb. Common in muddy places or on moist, sandy or silty soil of Jamuna River. Also found near temporary water ponds and similar situations in other areas of the Khadar tract.

Local name : Pola

Flowers and Fruits : Jan.-March

J. K. Maheshwari 591

110. Palmae (Arecaceae)

Leaves flabelliform, i.e. fan-shaped; leaflets connate to the middle *Livistona*

Leaves feather-like, i.e. pinnate : *Livistona*

Leaves bipinnate *Caryota*

Leaves simply pinnate : *Phoenix*

Lower leaflets spinescent *Phoenix*

Lower leaflets not spinescent : *Arenga*

Leaflets praemorse, i.e. coarsely eroded at the apex *Roystonea*

Leaflets long-tapering, acute or acuminate *Roystonea*

Livistona R. Br.

L. chinensis R. Br. Prodr. 268, 1810; Drude in Engl. & Prantl. N at

Pfam. 2 : 335; Blatt. Palms 104, t. 26; Bailey, Man. Cult. Pl. 168.
Latania chinensis Jacq. Frag. Bot. 16, t. 11, 1809.

A stout, fan-palm. Trunk bearing the bases of petioles and fibrous tissue. Leaves reniformly flabellate, 1.2-1.8 m. in diam., much plicated, cut to about the middle; segments linear-lanceolate, bending sharply downwards with age. Spadix paniculate, surrounded at the base by spathes. Flowers small, white. Fruits olive-shaped, oblong-ellipsoid, black.

Grown commonly in gardens and in front of bungalows as a tub fan-palm for decoration.

Fruits : Dec.

J. K. Maheshwari 577, Nicholson Gardens

Caryota Linn.

C. urens Linn. Sp. Pl. 1189, 1753; FBI. 6 : 422; Brandis, Ind. Tr. 654; Blatt. Palms 339, t. 57, f. 48; Santapau in RBSI. 16(1) : 327, 1953.

A tall, feather-leaved palm. Trunk greyish-black, with regular transverse bands. Leaves bipinnate, the primary divisions arched and drooping. Leaflets fasciculate or alternate, cuneiform, obliquely truncate, fish-tail-like. Spadix very large, 2.5-3.5 m. long. Peduncle curved, covered over with large, coriaceous spathes; branches very long, pendulous, resembling a huge horse-tail. Male buds narrowly cylindric. Fruits dark purple, pericarp thin.

Planted in gardens and shrubberies.

Flowers : Major part of the year. Fruits : July

J. K. Maheshwari 643, Rashtrapati Bhavan Compound; 1180

Phoenix Linn.

Foot of stem often surrounded by root suckers; leaflets making a very acute angle with the common petiole *P. dactylifera*

No root suckers :

Pinnae usually more than 2-ranked; leaves stiff or rigid

. *P. sylvestris*

Pinnae 2-ranked; leaves flaccid or soft *P. rupicola*

P. dactylifera Linn. Sp. Pl. 1188, 1753; Brandis, For. Fl. 552; Blatt. Palms 24, t. 8.

A tall tree. Trunk covered with the persistent bases of petioles, the foot often surrounded by a dense mass of root suckers. Leaves longer than those of *P. sylvestris* Roxb. Pinnae distichous; petioles laterally compressed. Male panicles compact on a short peduncle; flowers sweet-scented. Fruits oblong, reddish or yellowish-brown when ripe, with edible flesh. Seeds cylindric.

Cultivated in gardens for its edible fruits.

Local name : Khajur

Flowers : March-April. Fruits : Aug.-Oct.

J. K. Maheshwari, cultivated

P. sylvestris (Linn.) Roxb. Hort. Beng. 73, 1814, nom. nud. & Fl. Ind. 3: 787, 1832; Brandis, For. Fl. 554 & Ind. Tr. 645; FBI. 6: 425; FUGP. 3: 286; Blatt. Palms 3, tt. 2, 3; Santapau in RBSI. 16(1): 327, 1953.
Elate sylvestris Linn. Sp. Pl. 1189, 1753, in part.

A tall or stunted palm with a large, thick crown. Trunk rough from the persistent bases of petioles. Leaves pinnate, greyish-green; petioles compressed towards the apex and bearing a few short spines at the base. Leaflets fascicled, rigid, ensiform, canaliculate, spinous-pointed. Inflorescence and flowers as in *P. dactylifera* Linn. Fruits oblong-ellipsoid, orange-yellow to reddish-brown, edible. Seeds pale brown.

Wild along the railway routes from Delhi, in waste land near Gurukul, Faridabad, and in moist, shady or dry situations, forming dense masses at some places. The leaves are commonly attacked by *Graphiola phoenicis* Poit.

Local name : Khajoor

P. rupicola T. Anders. in JLS. 11: 13, 1871; Haines, Bot. Bih. & Or. 883; Blatt. Palms 14, t. 5; Bailey, Man. Cult. Pl. 171.

A slender, graceful palm, 4.5-6 m. high. Leaflets bifarious, not fascicled, flaccid, bright green, decurved; petiole compressed.

Planted as an ornamental palm in gardens, for its handsome appearance.

Arenga Labill. nom. cons.

A. saccharifera Labill. in Mém. Inst. Par. 4: 209, tt. 6, 7, 1803; FBI. 6: 421; Brandis, Ind. Tr. 648; Blatt. Palms 353, t. 60.

Gomutus saccharifer Spreng. Syst. 2: 624, 1825.

A beautiful, stout palm. Crown oblong, dense. Leaves large, oblong-ovate in outline. Leaflets linear, 4 to 5-fariously fascicled, coriaceous, white beneath; base 1 to 2-aucicled.

One of the most beautiful and useful palms. Cultivated in Delhi. It flowers about the tenth year.

English name : Sago palm

J. K. Maheshwari, passim in gardens

Roystonea O. F. Cook

R. regia (H. B. & K.) O. F. Cook in Bull. Torrey Bot. Cl. 531, 1901; Bailey, Man. Cult. Pl. 173.

Oreodoxa regia H. B. & K. Nov. Gen. & Sp. 1 : 305, 1815; Blatt. Palms 396, t. 73.

A tall, unarmed, annulate, graceful palm, 12 m. or more in tallness, with a columnar, single bole. Trunks smooth, covered all over with a whitish substance, generally more or less thickened at the middle. Leaves very large, terminal, pinnate; leaf sheaths elongate. Leaflets firmly papyraceous, ensiform, many-nerved lengthwise; apex shortly bifid.

Commonly planted in public gardens and parks along the roads, where it forms a magnificent avenue by its striking appearance. Such fine avenues are met in Edward Park (near Red Fort), Nicholson Gardens (near Kashmere Gate) and in the compound of Jantar Mantar in New Delhi.

Local name : Bottle palm
J. K. Maheshwari 1428

111. Pandanaceae

Pandanus Linn. f. nom. cons. prop.

P. fascicularis Lamk. Encycl. 1 : 372, 1785 ; FBI. 6 : 485; FUGP. 3 : 291.

P. odoratissimus Roxb. Fl. Ind. 3 : 738, 1832.

P. tectorius Soland. ex Balf. f. in JLS. 17 : 63, 56, 1878 ; Haines, Bot. Bih. & Or. 877.

A much-branched, thick bush or small tree, 3-3.6 m. high. Leaves borne closely spirally, erect, acuminate; margins and keels usually spinous-toothed. Spathes white. Male inflorescences very sweet-scented; flowers pedicellate; stamens many.

Planted in lawns and near temples for its very fragrant flowers.

Local name : Keora
Flowers : April-May
J. K. Maheshwari 711

112. Typhaceae

Typha Linn.

T. angustata Bory & Chaub. Exp. Sc. Mor. 3(2) : 33, 1832; FBI. 6 : 489; Graebn. in Pfreich. 2 : 14, f. 4 F; Santapau in RBSI. 16(1): 328, 1953.

T. elephantina Gr. 227, 1839 (non Roxb.).

A perennial, tall, marshy shrub, 1.5-3 m. high. Leaves usually exceeding the flowering stems, semi-cylindric above the sheath. Spikes cylindric; the males and females separated by a long interval. Female

spikes pale brown. Male flowers mixed with clavate-tipped pistillodes.
Pollen simple.

Common in the marshes and swamps, along Hindan River, near Shahdara, Okhla and Najafgarh, forming dense patches at some places.

Local name : Patera

Flowers : Oct.-May

J. K. Maheshwari 547

113. Araceae

Leaves undivided, peltate; spathes pale brownish-yellow

Leaves divided :

Tubers subglobose, smaller; leaves hastately tripartite; spathes purplish *Colocasia*

Tubers depressed-globose, 20-30 cm. across; leaves twice bifid; leaflets oblong-obovate *Typhonium*

Amorphophallus

Colocasia Schott

C. esculenta (Linn.) Schott in Schott & Endl. Melet. 1: 18, 1832; Merr. Enum. 1: 186; Santapau in RBSI. 16(1): 332, 1953.
Arum esculentum Linn. Sp. Pl. 965, 1753.

A. colocasia Linn. loc. cit.

Colocasia antiquorum Schott, loc. cit.; FBI. 6: 523; FUGP. 3: 302.

An erect, rhizomatous herb. Leaves peltate, large; petioles stout. Flowers and leaves together, often seen in vegetative state only. Spathes petaloid, pale brownish-yellow, caudate-acuminate, erect. Spadix shorter than spathe, cream-coloured. The fruits were not observed in the area.

Cultivated. The plant is valued for its edible, starchy, tuberous rhizomes. The leaves also are used as vegetables. The sap gives a permanent black stain to the clothes. The flowers were observed only on one occasion in a Government Farm 'Hatha' near Hindan River on September 11, 1955.

Local name : Arvi; Ghoyan; Kachalu ; English name : Arum

Flowers : Sept.

J. K. Maheshwari 1258

Typhonium Schott

T. trilobatum (Linn.) Schott in Wien. Zeitschr. 3: 72, 1829; FBI. 6: 509; Blatt. in JBNHS. 35: 22, 1931.

Arum trilobatum Linn. Sp. Pl. 965, 1753.

An erect, stemless, tuberous herb. Leaves radical, hastately 3-lobed

or tripartite long-petioled, reticulate-veined, entire; petiole bases sheathing. Peduncle long, thick, curved. Spathes ovate, narrowed into a long point, purplish. Flowers bisexual.

Grows as a herbaceous undergrowth in a fruit orchard 'Bagh Preetpar-wala, Seedora Khur,' Sabzimandi. From the local gardeners it was gathered that a few specimens were planted some years ago and now it has spread rather vigorously in this garden. It is believed to contain a very bitter principle.

Flowers and Fruits : June-Aug.

J. K. Maheshwari 1121, on July 10, 1955

Amorphophallus Bl. ex Decne. nom. cons.

A. campanulatus (Roxb.) Bl. ex Decne. in Nouv. Ann. Mus. Par. 3 : 366, 1834 (excl. syn. praeter Roxb.); FBI. 6 : 513; FUGP. 3 : 300; Blatt. in JBNHS. 35 : 26, 1931.

Arum campanulatum Roxb. Hort. Beng. 65, 1814, nom. nud. & Pl. Cor. 3 : 68, t. 272, 1820.

A perennial, stemless herb. Tubers depressed-globose, dark brown. Leaves one or two, radical, large, twice bifid, on long, tapering petioles. Leaflets oblong or obovate, acute, spreading.

Cultivated in small quantities in some gardens. The tuberous roots are boiled and eaten as vegetable.

Local name : Zaminkand

J. K. Maheshwari 1434

114. Lemnaceae

For a detailed account on the floral morphology of Indian Lemnaceae, see Charles McCann in JBNHS. 43: 148-163, Pl. 1-9, 1942.

Fronds with roots :

Fronds with several roots

Fronds with one root

Fronds minute, rootless

Spirodela

Lemna

Wolffia

Spirodela Schleid.

S. polyrhiza (Linn.) Schleid. in Linnaea 13 : 392, tt. 5, 6, 1839 ; FUGP. 3 : 305; McC. op. cit. 156.

Lemna polyrhiza Linn. Sp. Pl. 970, 1753; FBI. 6: 557.

Fronds herbaceous, broad obovate or orbicular, floating, opaque, thick, flat above, slightly convex below, dark green above, usually purplish beneath, each frond with multiple roots.

Common in the water of ponds, puddles and canals, often growing alone and forming a felt on the water surface.

Local name : Chowpatti
J. K. Maheshwari 1453

347

Lemna Linn.

L. paucicostata Hegelmaier, *Lemnac.* 138, t. 8, 1868; FBI. 6: 556; FUGP. 3 : 305; McC. op. cit. 153.

Fronds oblong, obovate-oblong or obovoid, rather thin, nearly flat on both surface, asymmetrical, entire. Root cap acute. Root sheath appendaged. Male flowers reduced to two stamens. Pollen echinate.

Common in canals, ponds, puddles and stagnant water collected near waste places; grows alone or associated with *Azolla pinnata* R. Br. and *Wolffia* sp. Under favourable conditions, the flowers are commonly produced in the area. The frond dies after seeding.

Local name : Chowpatti
J. K. Maheshwari 1455

Wolffia Horkel

Wolffia sp. (*microscopica* Kurz ?)

A very minute, granular, floating plant. Fronds opaque, subglobose, ovate, ovate-oblong or elliptic, slightly convex above, rootless. Young fronds sessile, arising from a pocket at the base of the old frond. Flowers arising from a central cup-like hollow in the centre of the frond. Male flowers solitary, i.e. of one stamen; anthers globose, 1-celled. Female flowers solitary; ovary globose or ovoid.

The smallest flowering plant in the world. Common throughout the pools, puddles and stagnant water ponds and canals, either growing alone and forming a green felt or associated with *Lemna* and *Azolla*. The male flowers are visible to the naked eye as a minute, white, raised dot on the frond.

Flowers : After rainy season
J. K. Maheshwari 1454

115. Alismataceae

Sagittaria Linn.

S. guayanensis H. B. & K. *Nov. Gen. & Sp.* 1 : 250, 1815; FBI. 6 : 561; FUGP. 3 : 310.

A floating, fibrous-rooted, aquatic or semi-aquatic herb. Leaves broad ovate, deep cordate, obtuse or rounded, obscurely nerved, membranous. Flowers whitish, in few, close whorls, on short, stout pedicels. Achenes numerous, flat; wing prominently toothed.

Common after the rains in Najafgarh Drain as a floating aquatic in shallow water or semi-aquatic on a muddy, marshy ground, associated with species of *Monochoria*, *Sphenoclea*, and others. Also met as a weed in flooded rice fields.

Flowers and Fruits : Sept.-Oct.

J. K. Maheshwari 438

116. Aponogetonaceae

Aponogeton Linn. f.

A. natans (Linn.) Engl. & Krause in Pfreich. 24 : 11, 1906.

Saururus natans Linn. Mant. 227, 1771.

Aponogeton monostachyus Linn. f. Suppl. 214, 1781 ('*monostachyon*'); FBI. 6 : 564; FUGP. 3 : 313.

A floating, scapigerous, aquatic herb. Leaves oblong to linear-oblong, 7-15 × 1.8-3 cm., acute or rounded; petiole slender, much longer than the blade. Flowers bright pink or bluish-purple, in solitary, densely flowered spikes. Stamens 6; anthers coloured. Seeds ribbed.

The plant is known to occur in the plains but was not collected by Duthie (FUGP, loc. cit.). Occurs in quiet water collected in ponds near Shahdara, where it flowers and fruits after rains.

Flowers and Fruits : Aug.-Nov.

P. P. Khanna 1108, Shahdara

117. Potamogetonaceae

Potamogeton Linn.

Upper or all leaves floating, elliptic or elliptic-lanceolate *P. indicus*

Leaves all submerged:

Leaves linear-oblong, crisped, translucent *P. crispus*

Leaves filiform *P. pectinatus*

P. indicus Roxb. Fl. Ind. 1 : 452, 1832; FBI. 6 : 565; Aschers. & Graebn. in Pfreich. 31 : 64; Santapau in RBSI. 16(1) : 333, 1953.

A floating or marshy, aquatic herb, brownish, pale purple throughout. Stems creeping below. Submerged leaves lanceolate, very thin; floating ones elliptic, elliptic-lanceolate or oblong, thicker. Stipules scarious. Spikes generally above the surface of water, erect, dense-flowered, reddish-brown in colour. Fruits 3-ribbed on the back.

Common in Hindan River and temporary water ponds and marshes near Shahdara.

Flowers : Cold season. Fruits : Summer season

J. K. Maheshwari 566

P. crispus Linn. Sp. Pl. 126, 1753; FBI. 6 : 566; FUGP. 3 : 315.
A slender, submerged, aquatic herb. Leaves 5-15 x 0.5-1 cm., linear or linear-oblong, crisped, finely serrulate, translucent, sessile. Spikes up to 1.5 cm. long, generally aerial, few-flowered. Fruits oblique-ovoid. Common in shallow, temporary water ponds and canals.
Flowers and Fruits : Cold and summer seasons
J. K. Maheshwari 570; 753; 1281, Shahdara

P. pectinatus Linn. Sp. Pl. 127, 1753; FBI. 6 : 567; FUGP. 3 : 315.
A filiform, grass-like, much-branched, aquatic herb. Leaves filiform. Stipules long-sheathing. Spikes aerial or on surface of water, short, few-flowered, in distant whorls. Fruits oblique, hardly keeled. Common in similar situations as *P. crispus* Linn.
Flowers and Fruits : Cold and summer seasons
J. K. Maheshwari 553; 1279

118. Zannichelliaceae

Zannichellia Linn.

Z. palustris Linn. Sp. Pl. 969, 1753; FBI. 6 : 568; FUGP. 3 : 316.
A slender, submerged, aquatic herb. Leaves filiform, pseudoverticillate. Flowers minute, unisexual. Male flowers subtended by a spathe, monandrous. Female flowers with a hyaline, tubular perianth. Carpels with an obliquely peltate, large stigma. Fruits stipitate, horned. Common in quiet or slowly moving water of Jamuna and Hindan Canals and ponds. In general appearance it resembles vegetative plants of *Potamogeton pectinatus* Linn. which, however, bears flowers in short spikes.

Flowers and Fruits : Oct.-Feb.
J. K. Maheshwari 589

119. Cyperaceae

Nut enclosed in an utricle; florets unisexual *Carex*
Nut not enclosed in an utricle :

Flowering glumes distichous *Cyperus*
Flowering glumes spirally arranged or sometimes the lowest subdistichous :

Style base dilated and constricted or articulated above the nut :
Hypogynous bristles present; leaves absent . . . *Eleocharis*
Hypogynous bristles absent; leaves usually present :
Style base often persistent, if falling not leaving a tumor on the nut *Fimbristylis*

- Style deciduous, leaving a tumor on the nut *Bulbostylis*
 Style base not dilated, continuous with the nut :
 Nut with or without hypogynous bristles; style base not swollen *Scirpus*
 Nut with 6, hypogynous scales, divided to the base into linear segments; stigmas 3 *Eriophorum*

Carex Linn.

C. fedia Nees in Wt. Contrib. 129, 1834.

C. wallichiana Presc. ex Nees, loc. cit. (non Spreng.).

An erect, glabrous herb with a stout rhizome bearing fibrous roots, 60 cm. or more in tallness. Stems triquetrous, leafy. Leaves longer than the inflorescence, coriaceous, scabrid. Panicles 25-40 cm. long, lax; spikes 5-8 x 1 cm., dioecious, long-tailed by the upper male portion. Female spikes : ovary naked; stigmas 3, prominently exerted. Utricle hairy, longitudinally nerved. Nuts trigonous, brown.

Common along the irrigation channels running across the fruit orchards near Azadpur and Karnal Road and those located along the railway lines from Delhi to Azadpur. Used as cattle fodder.

Local name : Motha

Flowers and Fruits : Feb.-April

J. K. Maheshwari 929

Cyperus Linn. sensu lato

- Stigmas 2; nut compressed or flattened:
 Nut flattened; rachilla of spikelet persistent:
 Nut compressed radially to the rachilla *C. pumilus*
 Nut compressed tangentially to the rachilla:
 Spikelets in a large, terminal, compound umbel *C. alopecuroides*
 Spikelets in a small, apparently lateral head *C. laevigatus*
 Nut laterally compressed; rachilla of spikelet deciduous :
 Glumes many; heads large, dense; spikelets greenish *C. pygmaeus*
 Glumes 4-5 only; heads smaller; spikes capitate, white :
 Spikes 3, aggregated into a compact head *C. triceps*
 Heads solitary :
 Nut bearing glume with a crest on the keel *C. kyllingia*
 Nut bearing glume not crested *C. brevifolius*

- Stigmas 3 ; nut triquetrous ;
 Plants cultivated; a stout, palm-like plant with several, involucreal leaves *C. flabelliformis*
- Plants wild; habit not palm-like
 Inflorescence a solitary head of 3-8 spikelets; spikelets white *C. niveus*
- Inflorescence umbellate, rarely a single head; spikelets not white ;
 Spikelets clustered in globose, nearly globose heads or contracted umbels;
 Spikelets in globose or nearly globose heads; rootlets not woolly : *C. uncinatus*
 Floral glumes mucronate *C. difformis*
 Floral glumes obtuse *C. atkinsonii*
- Spikelets in contracted umbels; rootlets woolly
 Spikelets shortly or very shortly spicate or subspicate ;
 Rachilla of spikelets distinctly or conspicuously winged ;
 Leaves short or obsolete ;
 Stems terete, transverse septa distinct when dry.
 Leaves absent. Bracts under 2.5 cm. long, scale-like *C. articulatus*
- Stems trigonous above, non-septate or hardly visible when dry. Leaves usually reduced, sometimes developed. Bracts large, up to half the length of the umbel *C. corymbosus*
- Leaves long, rarely less than half as long as, often longer than, the stem ;
 Stolons bulbiferous ; inflorescence of a head of umbels *C. bulbosus*
- Stolons not bulbiferous; umbels expanded; spikelets 3-8, in short spikes *C. rotundus*
- Rachilla of spikelets not or hardly winged ;
 Glumes cuspidate or aristate, yellowish when mature *C. compressus*
- Glumes obtuse or minutely mucronate, not cuspidate nor aristate ;
 Glumes plicate, broadly boat-shaped, gibbous towards the rachilla when folded; spikelets yellow . *C. iria*
- Glumes oblong or oblong-elliptic, not gibbous; spikelets pale, reddish-or chestnut-brown ;
 Spikelets crowded in an elongate spike; margins of glumes hyaline *C. eleusinoides*
- Spikelets not crowded in cylindric spikes, in fruit contracted into tassels; margins of glumes not or very inconspicuously hyaline . *C. nutans*

C. pumilus Linn. Cent. Pl. 2 : 6, 1756 & Amoen. Acad. 4 : 302; Kuekenh. in Pfreich. 101 : 375, f. 44 A-E.

Pycnus nitens Nees in Nov. Act. Nat. Cur. XIX, Suppl. 1 : 53, 1843; Cl. in FBI. 6 : 591.

P. pumilus Dom. in Bibl. Bot. 85 : 417, 1916.

A small, glabrous, fibrous-rooted, tufted plant, up to 20 cm. high. Leaves narrowly linear, acuminate; midrib prominent. Inflorescence an umbel of spikes on slender rays; primary bracts foliar, much exceeding the inflorescence. Spikelets 10-30 in a spike, linear, compressed, many-flowered, 2-ranked. Glumes ovate; keel excurrent into a curved mucro; hyaline wings nerveless. Nuts ellipsoid or obovoid, compressed.

Occurs along the banks or in the drying beds of Najafgarh Canal on soft, sticky soil.

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 441

C. alopecuroides Rottb. Descr. & Icon. 38, t. 8, f. 2, 1773; Kuekenh. op. cit. 71.

Juncellus alopecuroides Cl. in FBI. 6 : 595, 1893; FUGP. 3 : 340; Blatt. & McC. in JBNHS. 37 : 33, 1934.

An erect, stout, glabrous, marshy sedge, up to 1.5 m. high. Leaves linear, acuminate. Spikelets pale brown, numerous, in compact, broad spikes arranged in a compound inflorescence; primary and secondary rays umbellate. Glumes boat-shaped, keeled, acute or apiculate. Nuts broadly obovate, dull white or pale brown.

Occurs along the banks of canals and ponds.

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 477, Najafgarh; 888; 974, Roshanara Gardens

C. laevigatus Linn. Mant. 179, 1771; Kuekenh. op. cit. 321.

Juncellus laevigatus Cl. in FBI. 6 : 596, 1893; FUGP. 3 : 341; Blatt. & McC. op. cit. 34.

An erect, glabrous, tufted plant, up to 40 cm. high. Stems nearly terete, polished, bright green or straw-coloured, covered at the base with closed, leaf sheaths. Leaf blades often undeveloped. Spikelets up to 15 in a compact, one-sided head, sometimes solitary, pale straw-coloured. Glumes broad ovate, acute. Nuts broad ellipsoid, brown, smooth.

A plant of temporary moist localities, marshes, sandy beds of river and muddy soil.

Flowers and Fruits : July-Sept.

J. K. Maheshwari 312, near Okhla

C. pygmaeus Rottb. Descr. & Icon. 20, t. 14, ff. 4, 5, 1773.

Juncellus pygmaeus Cl. in FBI. 6 : 596, 1893; FUGP. 3 : 341.

Cyperus michelianus Link subsp. *pygmaeus* (Rottb.) Aschers. & Graebn.
Syn. 2(2) : 273, 1903.

A very tufted, prostrate or erect herb with numerous, close stems. Leaves narrowly linear, acuminate. Spikelets numerous, in a dense, solitary, terminal head. Glumes distichous, narrowly boat-shaped, acute or acuminate. Nuts ellipsoid, tipped by the style base, plano-convex.

Common in the sandy or silty beds of Jamuna River and its banks, during the winter season. Also found in marshes, near ponds, etc. forming a dense tuft of plants on damp soil.

Flowers and Fruits : Oct.-July
J. K. Maheshwari 146

C. triceps (Rottb.) Endl. Cat. Hort. Vindob. 1 : 94, 1842; Kuekenh. in Pfreich. 101 : 578.

Kyllinga triceps Rottb. Descr. & Icon. 14, t. 4, f. 6 (excl. cit. Rheed.), 1773; FBI. 6 : 587; FUGP. 3 : 343.

K. monocephala Nees in Wt. Contrib. 91, 1834 (non Roxb.).

A small, glabrous, tufted plant, 8-20 cm. high. Leaves linear, one half or nearly as long as stems. Spikes ovoid or cylindric-ovoid, white, usually 3 (sometimes 5), aggregated into a compact head. Spikelets 1-flowered. Third glume ovate, with smooth, green keel. Nuts oblong or ellipsoid-oblong, laterally compressed.

Common on the Ridge during the monsoon period on gravelly soil or amongst stones and in the crevices, often associated with *Oropetium thomaeum* Trin. Also found in the plains near canals and similar moist localities.

Flowers and Fruits : Aug.-Nov.
J. K. Maheshwari 1457

C. kyllingia Endl. Cat. Hort. Vindob. 1 : 94, 1842; Kuekenh. op. cit. 606, f. 64 C-D.

Kyllingia monocephala Rottb. Descr. & Icon. 13, t. 4, f. 4, 1773 (excl. syn. nonnullus); FBI. 6 : 588; FUGP. 3 : 344.

Cyperus monocephalus F. Muell. Fragm. 8 : 271, 1874 (non Roxb. 1814 & 1832, quae est *C. cephalotes* Vahl).

An erect, glabrous plant, up to 30 cm. tall, with creeping rhizomes. Leaves linear, acuminate, as long as the stem. Spikes subglobose, white, solitary. Spikelets obliquely lanceolate-elliptic, one-flowered. Third glume boat-shaped, acuminate, 3-nerved on each side of the prominently winged, serrulated keel. Nuts obovate, much compressed.

Common and abundant in fruit orchards during rainy season as an herbaceous undergrowth on moist soil, near canals, ponds and similar places.

Local name : Bhada; Motha
 Flowers and Fruits : June-Sept.
 J. K. Maheshwari 108; 406

C. brevifolius (Rottb.) Hassk. Cat. Hort. Bogor. 24, 1844; Kuekenh. op. cit. 600.

Kyllinga brevifolia Rottb. Descr. & Icon. 13, t. 4, f. 3, 1773; FBI. 6 : 588; FUGP. 3 : 343.

An erect, glabrous plant with slender, horizontal rhizomes, 15-30 cm. tall. Leaves linear, erect, shorter or as long as the stem. Spikes ovoid, solitary, white. Spikelets ovate-lanceolate to lanceolate, one-flowered. Third glume 2-nerved on either side of the serrated, non-winged keel. Nuts obovate-ellipsoid, much laterally compressed.

Common in similar localities as *C. kyllingia* Endl.

C. flabelliformis Rottb. Descr. & Icon. 42, t. 12, f. 2, 1773.

C. alternifolius Linn. subsp. *flabelliformis* Kuekenh. in Pfreich. 101 : 193, 1936.

An erect, stout, palm-like plant, 60-120 cm. high. Involucral leaves 15-25, prominently nerved, much exceeding the umbel. Umbels lax, numerous, crowded at the top of primary rays. Spikelets compressed, lustrous. Glumes carinate, apiculate, closely imbricate.

Native of Africa. Grown as an ornamental sedge in ferneries, plant houses and near small pools of water in gardens.

Local name : Nagarmotha

Flowers and Fruits : Nov.-May

J. K. Maheshwari 584, Nicholson Gardens

C. niveus Retz. Obs. 5 : 12, 1788; FBI. 6 : 601; FUGP. 3 : 327; Blatt. & McC. in JBNHS. 37 : 261, 1934.

An erect, glabrous, tufted herb with a short, woody rhizome and slender, fibrous roots. Leaves nearing or exceeding the inflorescence, narrowly linear. Inflorescence a solitary head of 3-8 spikelets. Spikelets white, much compressed, linear. Glumes distichous, ovate-lanceolate, close-nerved. Nuts dark brown, triquetrous, lower part of style persistent.

Uncommon on the Ridge as well as the neighbouring hilly tracts near Faridabad on sandy or gravelly soils.

Flowers and Fruits : July-Oct.

J. K. Maheshwari 719; 1187, Ridge

C. uncinatus Poir. in Lamk. Encycl. 7 : 247, 1806; FUGP. 3 : 325; Blatt. & McC. op. cit. 258.

C. cuspidatus H.-B. & K. Nov. Gen. & Sp. 1 : 204, 1815; FBI. 6 : 598.

An erect, glabrous, tufted sedge, 10-25 cm. high, with several floral

shoots. Leaves all basal, narrowly linear, acute or acuminate. Inflorescence umbellate, some rays sessile; each ray ending in a compact, nearly globose head. Glumes keeled, passing into an outwardly curved awn about half as long as the glume blade. Nuts obovoid.

Occurs on moist or damp, sandy soil of cultivated and fallow fields.

Flowers and Fruits : Aug.-Nov.

J. K. Maheshwari 972, Hauz Khas

C. difformis Linn. Cent. Pl. 2 : 6, 1756; FBI. 6 : 599; FUGP. 3 : 325; Blatt. & McC. op. cit. 259; Kuekenh. op. cit. 237, f. 27 F-H.

An erect, tufted, annual herb with numerous, fibrous roots. Leaves usually shorter than the stem, smooth. Inflorescence of 3-6, compact heads of spikelets, nearly globose, some rayed, others sessile. Glumes closely imbricate, brown at maturity. Nuts trigonous, obovoid, pale brown.

Met in damp or moist, sandy or sandy-clayey soil of unused ground and fallow fields. It is readily distinguished by the dense, round heads of the umbel.

Flowers and Fruits: After rains

J. K. Maheshwari 973, Hauz Khas

C. atkinsonii Cl. in JLS. 21 : 109, 1884; FBI. 6 : 603; Blatt. & McC. op. cit. 262; Kuekenh. op. cit. 271.

An erect, glabrous plant with a woody rhizome. Stems thickened at base. Umbels simple, contracted. Spikelets linear, much compressed, many-flowered, whitish or pale brown. Glumes closely imbricate.

A new record from the Upper Gangetic Plain. Occurs in moist or wet soils near canals, ponds and puddles.

Flowers and Fruits : Aug.-Oct.

C. articulatus Linn. Sp. Pl. 44, 1753; FBI. 6 : 611; Kuekenh. op. cit. 77.

A glabrous, usually leafless sedge. Stems terete, stout, 90-180 cm. high, when dry usually with distinct, transverse septa. Umbels compound; primary rays often 10, up to 15 cm. long; bracts usually 1×0.5 cm., ovate, scale-like. Secondary rays in corymbs of 8-15 spikelets. Spikelets narrowly linear. Nuts trigonous; style branches linear, 3, exserted.

A new record from the Upper Gangetic Plain. A water-loving sedge, usually found in standing water of ponds and canals.

Flowers and Fruits : April-Oct.

J. K. Maheshwari 1157, Hindan River

C. corymbosus Rottb. Descr. & Icon. 42, t. 7, f. 4, 1773; FBI. 6 : 612; FUGP. 3 : 336; Blatt. & McC. op. cit. 270; Kuekenh. op. cit. 80, f. 10.

A tall, glabrous, rush-like plant with creeping, woody rhizomes. Leaves reduced to sheaths but sometimes with a linear, acute blade.

Umbels compound; primary rays slender; secondary rays terminated by spikes or corymbs of 4-16 spikelets. Glumes straw-coloured, pale reddish-brown or red-brown. Nuts narrowly obovoid.

Common in marshy places and near canals.

Flowers and Fruits : July-Dec.

C. bulbosus Vahl, Enum. 2 : 342, 1806; FBI. 6 : 611; FUGP. 3 : 336.

An erect, perennial, tufted herb. Bulbs clothed with scale leaves. Leaves borne in lower part of the stem, from 1.2-7 cm. above the bulb; blades narrowly linear. Inflorescence with tufts of sessile spikelets in a spike and forming a contracted umbel. Spikelets chestnut-brown. Glumes many-nerved.

Common in waste and unused, dry, gravelly places and in crevices amongst stones on the Ridge.

Local name : Motha

Flowers and Fruits : July-Dec.

J. K. Maheshwari 971, Karnal Road

C. rotundus Linn. Sp. Pl. 45, 1753; FBI. 6: 614; FUGP 3 : 332; Kuckenth. op. cit. 107, f. 13.

An erect, glabrous herb, up to 60 cm. high. Leaves usually shorter than the stem, linear. Inflorescence an umbel of more or less condensed spikes; bracts foliar, generally three, exceeding the umbel. Spikelets pale yellow or brown, often with a reddish tinge. Glumes decurrent below as hyaline wings. Nuts obovoid-ellipsoid.

A common and variable weed during the rainy season in lawns, unused ground and fields, growing in different types of habitats, often becoming abundant and dominating the vegetation.

Local name : Motha

Flowers and Fruits : July-Oct.

J. K. Maheshwari 779; 1052

C. compressus Linn. Sp. Pl. 46, 1753; FBI. 6 : 605; FUGP. 3 : 328; Blatt. & McC. in JBNHS. 37 : 262, 1934; Kuekenth. op. cit. 156.

An erect herb with numerous, fine, tufted roots, the whole plant greenish or greyish-green. Leaf blades narrowly linear, tapering to a fine, acuminate tip. Inflorescence umbellate; some of the rays sessile. Spikelets in condensed, umbellate spikes, strongly compressed laterally. Glumes green on the sides, winged. Nuts broadly triquetrous, dark brown.

Common during the monsoon period on the Ridge, along streams, by roadsides, in waste places and along paths on moist, silty or sandy soil.

Local name : Mothi

Flowers and Fruits : July-Oct.

J. K. Maheshwari 256; 1115

C. iria Linn. Sp. Pl. 45, 1753; FBI. 6 : 606; FUGP. 3 : 329; Kuekenth. op. cit. 150.

An erect, glabrous annual, variable in size and form. Stems striate. Leaf blades linear, acuminate; sheaths brown. Umbels compound, the primary rays branched secondarily in an umbellate manner. Primary bracts foliar. Spikelets spicately arranged. Glumes broadly boat-shaped, keeled; wings nerveless. Nuts triquetrous, ellipsoid, black. Common during the monsoon period in marshy places, fields and ditches. Easily recognized by its dull yellow spikelets.

Local name : Motha

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 347

C. eleusinoides Kunth, Enum. 2 : 39, 1837; FBI. 6 : 608; FUGP. 3 : 330.

C. nutans Vahl var. *eleusinoides* Haines, Bot. Bih. & Or. 898, 1924.

An erect, glabrous, tall perennial. Stems triangular. Leaf blades linear, acuminate; midrib keeled below; margins scabrid. Umbels compound, with very unequal primary rays; primary bracts many, foliar. Spikelets spicate on ultimate branches, linear, pale brown. Glumes elliptic, broadly keeled. Nuts ellipsoid, trigonous.

Rare in marshes and along canal banks

Flowers and Fruits : July-Sept.

J. K. Maheshwari 1429

C. nutans Vahl, Enum. 2 : 363, 1806; FBI. 6 : 607; Blatt. & McC. op. cit. 266.

An erect, stout sedge, 60-120 cm. high. Spikelets grey-brown, in a large, decompound umbel, spirally spiked on the ultimate branches, suberect, forming more or less a thyrses and appearing at maturity like a tassel. Glumes linear or oblong, apiculate, scarious-margined. Nuts triquetrous.

A new record from Delhi State. Occurs rarely near ponds and canal banks.

Flowers and Fruits : July-Sept.

J. K. Maheshwari 1048, Roshanara Gardens

Eleocharis R. Br.

Some books on Indian flora describe this genus under *Heleocharis*.

For a correct spelling, see Sprague in Kew Bull. p. 352, 1928.

Rhizome absent; a small, tufted sedge, up to 10 cm. high; spikelets 0.3-0.5 cm. long *E. atropurpurea*

Rhizome creeping; a taller sedge, up to 45 cm. high; spikelets 1-2.5 cm. long *E. palustris*

E. atropurpurea (Retz.) Kunth, Enum. 2 : 151, 1837; FBI. 6 : 627; FUGP. 3 : 348; Blatt. & McC. in JBNHS. 37 : 537, 1934.

Scirpus atropurpureus Retz. Obs. 5 : 14, 1788.

A small, tufted, filiform annual, up to 10 cm. high. Leaves absent; sheaths short. Spikelets solitary, terminal, 3-5 mm. long, ovoid, dark brown, broader than the stem. Glumes ovate-oblong, obtuse; margins dark-coloured. Bristles white. Nuts minute, black, biconvex, tipped by the style base.

Occurs on moist, clayey soils or on damp rice fields after the harvest. Met in the fields of Timarpur after harvest on blackish soil; often associated with *Scirpus roylei* Parker.

Flowers and Fruits : Sept.-Oct.

J. K. Maheshwari 1272

E. palustris R. Br. Prodr. 224, 1810, in obs.; FBI. 6 : 628; FUGP. 3 : 348; Blatt. & McC. op. cit. 538.

An erect, marshy, tufted sedge with a creeping rhizome, up to 45 cm. high. Stems terete, longitudinally striate. Leaves absent, sheaths truncate. Spikelets solitary, terminal, 1-2.5 cm. long, ellipsoid or cylindric, yellow or brown, broader than the stem. Glumes closely imbricate, ovate-lanceolate or elliptic. Bristles brown, retrorsely scabrid. Nuts broadly obovoid, biconvex, tipped by the broad style base.

Common in the marshy places near Shahdara and Hindan River. Also met near the temporary water collected in ponds and puddles in the hilly tracts near Gurukul, Faridabad.

Flowers and Fruits : Dec.-April

J. K. Maheshwari 630 ; 817

Fimbristylis Vahl nom. cons.

Spikelets solitary; nuts trigonous

Spikelets more than one :

Stigmas 2; nuts biconvex :

Glumes hoary-hairy in the upper half

Glumes glabrous :

Leaves often as long as the stem, not coriaceous; nuts ribbed and trabeculate

Leaves always short, coriaceous; nuts not ribbed or trabeculate

Stigmas 3; nuts trigonous :

Spikelets or some of them in clusters of 2-5

Spikelets discrete :

All glumes spirally imbricate; spikelets small

Lower glumes distichous; spikelets longer

F. monostachya

F. ferruginea

F. dichotoma

F. spathacea

F. junciformis

F. quinquangularis

F. tenera var. *oxylepis*

F. monostachya (Linn.) Hassk. Pl. Jav. Rar. 61, 1848; FBI. 6 : 649; FUGP. 3 : 355; Blatt. & McC. in JBNHS. 37 : 548, 1934.

Cyperus monostachyos Linn. Mant. 2 : 180, 1771.
A tufted, slender herb. Leaves about half as long as the stem or more. Spikelets ovoid, acute, solitary, terminal, pale green, somewhat polished. Glumes ovate, boat-shaped, keeled, cuspidate. Nuts pyri-

form, trigonous, straw-coloured. Occurs in marshy or moist situations in open ground.

Flowers and Fruits : Sept.-Oct.

J. K. Maheshwari 1049, Shahdara.

F. ferruginea (Linn.) Vahl, Enum. 2 : 291, 1806; FBI. 6 : 638; FUGP. 3 : 354; Blatt. & McC. op. cit. 544.

Scirpus ferrugineus Linn. Sp. Pl. 50, 1753.

An erect, tufted herb. Leaves about half as long as the stem or less, scabrid along the margins. Spikelets in simple or sometimes compound umbels, usually 5-15, ellipsoid. Glumes broad ovate, concave, hoary in the upper half, brown. Nuts pale brown, biconvex, suborbicular, minutely stipitate and apiculate.

Common along the banks of canals, rivers and ponds on sandy, moist or wet soil and other moist situations near water taps and pipes. A good distinguishing character of this sedge is the hairiness in the upper half of the glumes.

Flowers and Fruits : June-Oct.

J. K. Maheshwari 172; 287; 1120; 1242; 1259

F. dichotoma (Linn.) Vahl, Enum. 2 : 287, 1806; FBI. 6 : 635; FUGP. 3 : 351.

Scirpus dichotomus Linn. Sp. Pl. 50, 1753.

A tufted, fibrous-rooted annual. Leaves as long as the stem or shorter, scabrous beneath. Umbels compound or decompound. Spikelets ovate, subcylindric, sessile and pedicelled. Glumes boat-shaped, keel excurrent as a mucro. Rachilla after the fall of the glumes deeply pitted. Nuts pale brown, 5 to 9-ribbed, transversely rugose.

Common in moist, sandy or silty soil of Jamuna banks and ravines and similar situations in Khadar area. It differs from the closely related *F. diphylla* Vahl in the spikelets not terete and glumes keeled appreciably. The fresh roots emit a fragrant smell.

Flowers and Fruits : Feb.-June

J. K. Maheshwari 975

F. spathacea Roth, Nov. Pl. Sp. 24, 1821; FBI. 6 : 640; FUGP. 3 : 352.

A perennial, rhizome-bearing, tufted plant. Stems terete, striate. Leaves many at the base, much shorter than stems, coriaceous. Spikelets brown, ovoid, in simple or compound umbels. Styles conspicuously

swollen at the base. Nuts minutely stipitate, biconvex, minutely rugose.

Occurs during the rains on moist, grassy plains near canals, forming dense tufts over a large distance.

Local name : Landas

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 1263, near Hindan River

F. junciformis Kunth, Enum. 2 : 239, 1837; FBI. 6 : 647; FUGP. 3 : 357; Blatt. & McC. op. cit. 546.

An erect, small sedge, 15-30 cm. high, with a woody, horizontal rhizome. Stems angular, striate. Leaves crowded at the base, pointed. Spikelets clustered or solitary, in compound umbels. Bracts foliar. Glumes ovate, brown. Nuts trigonous, obovoid, straw-coloured.

The occurrence of this plant is based on the authority of Jameson (see Duthie in FUGP. loc. cit.) who collected it from the village Bammikhera in Delhi district in October 1842. I have not seen the plant in the field.

F. quinquangularis Kunth, Enum. 2 : 229, 1837; FBI. 6 : 644; FUGP. 3 : 356; Blatt. & McC. op. cit. 547.

An erect, tufted annual with several fibrous roots. Leaves longer or shorter than the stems, scabrid along the margins. Spikelets very numerous, small, ellipsoid or narrowly ovoid, in decomposed umbels; pedicels filiform. Glumes ovate; keel 3-nerved, slightly excurrent. Nuts globose-obovoid, pale brown, minutely tuberculate.

Common in the marshes of Najafgarh Canal, along canal banks and similar moist situations.

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 977

F. tenera Roem. & Schult. var. *oxylepis* Cl. in FBI. 6 : 642, 1893.

An erect, tufted plant, 15-30 cm. high. Leaves about half the length of stems. Umbels lax, subcompound, consisting of a sessile spikelet, 2-3 pedicellate spikelets and 2-3 rays with one sessile and 1 or 2 pedicellate spikelets. Spikelets subcylindric or narrowly ovoid, 5-10 × 2 mm. Glumes ovate, brown; keel prominent, excurrent. Rachillar areoles large, depressed. Nuts obovoid, dirty white or yellowish-brown, verrucose.

Common near canals, ponds and in fields of rainy and winter season crops on drying soil.

Flowers and Fruits : July-Oct.

J. K. Maheshwari 976, Najafgarh; 1262, Ridge; 1309, Vallabgarh fields

Bulbostylis Kunth nom. cons.

B. barbata (Rottb.) Cl. in FBI. 6: 651, 1893; FUGP. 3: 358; Kern in Reinwardtia 6: 51, 1961.

Scirpus barbatus Rottb. Descr. & Icon. 52, t. 17, f. 4, 1773.

A densely tufted herb with fibrous roots. Stems and leaf blades filiform. Leaf sheaths with long, fine hairs in the mouth. Spikelets in small, dense, terminal heads, brown. Glumes boat-shaped. Nuts trigonous, dull white, very minutely stipitate; style leaving a very minute button on the nut.

Common as a weed during the monsoon period in the fallow and cultivated fields of rainy and winter season crops, on damp, sandy-clayey or sandy soil. It is locally believed that an aggressive growth of this sedge considerably affects crop growth.

Local name : Musadadhi; Plaza

Flowers and Fruits : Sept.-Oct.

J. K. Maheshwari 323, near Qutab

Scirpus Linn.

Spikelets sessile, usually many, in simple clusters or heads; short sedges :
Clusters lateral on the stem:

Heads borne near the base; glumes acute, scarcely keeled . . .

Heads situated about or above the middle of the stem; glumes mucronate, keeled . . . *S. articulatus*

Clusters terminal . . . *S. roylei*

Spikelets many-stalked or umbelled; tall sedges : . . . *S. affinis*

Umbels lateral, the lowest bract erect, appearing as a continuation of the stems; spikelets smaller . . . *S. littoralis*

Umbels terminal, bracts foliar; spikelets larger . . . *S. tuberosus*

S. articulatus Linn. Sp. Pl. 47, 1753; FBI. 6: 656; FUGP. 3: 360.

An amphibious, moisture-loving sedge with fibrous roots and erect, hollow, terete, light green culms (flat in dried specimens). Leaves appear in the juvenile stage under water and fall away before the inflorescence, leaving a membranous sheath. Spikelets pale brown, in a solitary, dense, lateral head, situated often near the base. Bristles absent. Nuts obovoid, triquetrous, black, apiculate.

Common in paddy fields on moist or muddy soil, near canal banks on drying flooded areas and in marshes, growing alone or with *S. roylei* Parker.

Flowers and Fruits : Sept.-Oct.

J. K. Maheshwari 978, Najafgarh

S. roylei (Nees) Parker in FUGP. 3 : 361, 1929.

Isolepis roylei Nees in Wt. Contrib. 107, 1834.

Scirpus quinquefarius Buch.-Ham. ex Boeck. in Linnaea 36: 701, 1870; FBI. 6 : 657.

An erect, tufted, fibrous-rooted sedge, 20-45 cm. high. Stems terete, slender, conspicuously transverse-septate. Leaf sheaths membranous. Spikelets usually several and above the middle of the stem, in a solitary, lateral head, yellowish. Glumes membranous, concave, keeled. Nuts triquetrous.

Common in drying paddy fields, on muddy or wet soil and in marshes near canals and streams, often associated with *S. articulatus* Linn., from which it differs in possessing slender stems and the lateral heads usually borne above the middle of the stems.

Flowers and Fruits : Sept.-Oct.

J.K. Maheshwari 970, Najafgarh

S. affinis Roth, in Roem. & Schult. Syst. 2 : 140, 1817 & Nov. Pl. Sp. 30, 1821 ; Raymond in Nat. Conad. 86 : 227, 1959.

S. strobilinus Roxb. Hort. Beng. 6, 1814, nom. nud. & Fl. Ind. 1 : 222, 1820.

S. maritimus var. *affinis* Cl. in FBI. 6 : 659, 1893; FUGP. 3 : 363.

An erect, spongy-rooted sedge with smooth, horizontal rhizomes. Stems up to 5 cm. tall, thickened at their base, sharply trigonous, leafy. Leaf blades 20×5 mm. Bracts 1-3, unequal. Spikelets 1-5, sessile, 2×1 mm., light brown. Nuts lenticular, dark brown, ovate, apiculate.

Common along the banks as well as in the bed of Jamuna River on wet or muddy soil and near temporary ponds in the Khadar tract.

Flowers and Fruits : Feb.-June

J. K. Maheshwari 175; 628; 843; 1007

S. littoralis Schrad. Fl. Germ. 1 : 142, t. 5, f. 7, 1806; FBI. 6 : 659; FUGP. 3 : 362.

A hygrophilous, tall sedge with creeping rhizomes. Stems 1 m. or more in tallness, terete, hollow. Leaves develop under the surface of water and fall before the appearance of aerial inflorescence. Spikelets reddish-brown, in lax, subcorymbose or paniculate umbels, borne laterally near the apex. Glumes notched at the tip, mucronate by the excurrent keel. Bristles soft, linear. Nuts broad obovoid, biconvex, dull brown.

Common in or along the Najafgarh Canal and in the temporary ponds near Shahdara. The plants appear as if they grow in rows due to the long, creeping rhizomes.

Flowers and Fruits : Sept.-Nov.

J. K. Maheshwari 750; 794

S. tuberosus Desf. Fl. Atlant. 1 : 50, 1798 ; Beetle in Amer. Jour. Bot. 29: 84, 1942.

S. maritimus Linn. Sp. Pl. 51, 1753, in part ; FBI. 6 : 658 ; FUGP.

An erect, variable sedge, 30-100 cm. high, with creeping rhizomes and woody tubers. Stems stout, trigonous. Leaves often as long as the stem, coriaceous. Umbels simple or compound; rays unequal. Spikelets 3-8 or solitary on each ray, dull or dark brown, ovate, oblong, elliptic. Glumes bifid at the apex; keel excurrent as a curved awn. Bristles present, scabrid. Nuts plano-convex, smooth, polished, brown.

Common in marshes near Najafgarh Canal, Hindan River and Shahdara, in beds of drying ponds and canals, and along Jamuna River. The sedge is amphibious as it occurs either in water or on marshy soil.

Flowers and Fruits : March-July

J. K. Maheshwari 311; 1008

Eriophorum Linn.

E. comosum Wall. ex Nees in Wt. Contrib. 110, 1834; FBI. 6 : 664; FUGP. 3 : 366.

An erect, slender, tufted sedge. Leaves usually longer than the stem, very narrowly linear. Spikelets narrowly ellipsoid, reddish-brown, numerous, in compound or decoumpound, irregular umbels. Bracts several, exceeding the inflorescence. Nuts trigonous-fusiform, brown, subtended by a ring of grey-cottony hairs much longer than the fruit.

An amphibious sedge, occurring along the banks of ponds or in shallow water collected near Shahdara.

Flowers and Fruits : Oct.

J. K. Maheshwari 1217

120. Gramineae (Poaceae)

1. Shrubs or trees; leaves usually with a petiole-like base, articulated with the sheaths 1. *Bambusa*
1. Herbs or shrubs; leaves usually sessile, not articulated with the sheaths:
 2. Male and female spikelets in separate inflorescences . . . 2. *Zea*
 2. Spikelets all hermaphrodite with male or barren or hermaphrodite spikelets mixed in the same inflorescence :
 3. Spikelets in heads with a spathe or spatheole at the base of the short peduncle :
 4. Spikelets in groups of threes; awn slender . . . 3. *Aphuda*
 4. Spikelets in racemes, the lower pair forming a false involucre around the remainder 4. *Iseilema*

3. Spikelets without a spathe or spatheole at the base :
5. Inflorescence a feather or fan-shaped, silvery-white or often coloured panicle :
6. Spikelets surrounded by dense, white or coloured hairs forming a silvery-white, purplish or coloured panicle :
7. Spikelets all pedicelled, awned; panicles flabelliform 5. *Miscanthus*
7. Spikelets paired, one sessile, the other pedicelled :
8. Spikelets awned 6. *Erianthus*
8. Spikelets usually awnless 7. *Saccharum*
6. Spikelets not conspicuously hairy :
9. Hairs arising from the margins of the upper floral glume 8. *Thysanolaena*
9. Hairs arising from the callus 9. *Phragmites*
9. Hairs arising from the back of floral glumes 10. *Arundo*
5. Inflorescence a single raceme or spike, terminal or terminating the culms and their branches (spikes subcapitate in *Aeluropus*):
10. Spikelets awned :
11. Lower glumes with pits 11. *Eremopogon*
11. Lower glumes without pits :
12. Racemes coloured, purplish-violet 12. *Perotis*
12. Racemes not coloured :
13. Awns dark brown, together in a bundle when young, strongly geniculate and twisted later 13. *Heteropogon*
13. Awns separate, not twisted :
14. Spikelets borne in the hollows of a long spike 14. *Lolium*
14. Spikelets not borne in the hollows :
15. Rachilla produced beyond the lower floral glume 15. *Tetrapogon*
15. Rachilla not at all produced beyond the lower floral glume :
16. Spikelets cottony, in fascicles, in a lax raceme 16. *Melanocenchris*
16. Spikelets borne in a continuous, compact spike, not cottony :
17. Spikelets solitary, 2 or more flowered 17. *Triticum*
17. Spikelets in threes, 1-flowered 18. *Hordeum*
10. Spikelets not awned :
18. Spikelets subtended by bristles :
19. Bristles forming a cup 19. *Cenchrus*

- 19. Bristles not forming a cup :
 - 20. Culms short; spikes up to 10 cm. long; plants wild 20. *Setaria*
 - 20. Culms tall; spikes above 10 cm. ; plants cultivated 21. *Pennisetum*
- 18. Spikelets not subtended by bristles :
 - 21. Upper glumes armed with hooked spinules 22. *Tragus*
 - 21. Upper glumes unarmed :
 - 22. Racemes silvery-white 23. *Imperata*
 - 22. Racemes not silvery-white :
 - 23. Pedicels of spikelets and joints fused; a grass found in wet places 24. *Hemarthria*
 - 23. Pedicels free from the joints :
 - 24. Spikelets minute, half-sunk in the rachis; a very small, densely tufted grass 25. *Oropetium*
 - 24. Spikelets not sunk in the rachis :
 - 25. Keels of involucreal glumes broadly winged 26. *Phalaris*
 - 25. Keels of involucreal glumes, if present, not winged:
 - 26. Spikes subcapitate 27. *Aeluropus*
 - 26. Spikes cylindric, linear or oblong :
 - 27. Spikes 20-30 cm. long, terminal; spikelets distichous, laterally compressed 28. *Eragrostiella*
 - 27. Spikes 2.5-12 cm. in length :
 - 28. Involucreal glumes glabrous; palea long-ciliate, imparting a hairiness to the inflorescence; slender annuals 29. *Eragrostis*
 - 28. Involucreal glumes ciliate on the keels; racemes densely cylindric; palea absent 30. *Alopecurus*
 - 28. Involucreal glumes glabrous; racemes longer, compact; palea ciliate; species cultivated 17. *Triticum*
 - 5. Inflorescence a terminal, digitate spike :
 - 29. Spikelets awned :
 - 30. Leaf margins with bulbous-based cilia; spikelets solitary or clustered, rather distant; rachilla not at all produced beyond the floral glume 31. *Alloteropsis*
 - 30. Leaf margins glabrous; spikelets secund, closely imbricate; rachilla produced beyond the lower floral glume :
 - 31. Spikes digitately 1-3 15. *Tetrapogon*

31. Spikes digitate, more than 3 32. *Chloris*
29. Spikelets unawned :
32. Racemes usually 2; spikelets broad elliptic, distichous 33. *Paspalum*
32. Racemes usually more than 2 :
33. Spikes long; spikelets plano-convex, 2-flowered, narrowly appressed; taller grasses 34. *Digitaria*
33. Spikes short; spikelets lanceolate, 1-flowered; slender grasses 35. *Cynodon*
33. Spikes long or short; spikelets laterally compressed, more than 2-flowered :
34. Rachis ending in a spikelet 36. *Eleusine*
34. Rachis ending in a mucro 37. *Dactyloctenium*
5. Inflorescence of long or short racemes or spiciform racemes arranged on a long or short central axis (sometimes Subdigitate in *Dichanthium*) :
35. Racemes or spike-like racemes up to 2 cm. long, pointing upwards:
36. Spikelets glabrous, polished, globose, turning yellow 38. *Paspalidium*
36. Spikelets hairy, dull green 39. *Echinochloa*
35. Racemes or spike-like racemes longer than 2 cm., often much longer, ascending or spreading; if shorter, then spikelets many-flowered, shining brown :
37. Spikelets awned :
38. Lower involucre glume awned :
39. Leaves ovate-lanceolate to lanceolate; base constricted or rounded; spikes lax, long or short and narrow, sticky or not 40. *Oplismenus*
39. Leaves linear; base not constricted or rounded; spikes dense, shorter and broader, not sticky 39. *Echinochloa*
38. Lower involucre glume not awned; floral glume awned :
40. Panicles with a long, primary axis; spikes shorter and broader, dense 39. *Echinochloa*
40. Panicles subdigitate or with a short, primary axis; spikes longer and narrower :
41. Lower involucre glumes with pits 41. *Bothriochloa*
41. Lower involucre glumes without pits 42. *Dichanthium*
37. Spikelets not awned :
42. Spikes digitate, subdigitate or with a short primary axis :
43. Spikelets many-flowered 36. *Eleusine*

43. Spikelets 2-flowered :
 44. Lower involucre glume absent; spikelets broad and larger 33. *Paspalum*
 44. Lower involucre glume a minute scale or obsolete; spikelets narrower and small 34. *Digitaria*
 42. Spikes in panicles on a longer axis :
 45. Spikelets many-flowered, shining brown; spikes short 43. *Desmostachya*
 45. Spikelets 2-flowered, not brown nor shining :
 46. Spikelets very minute, about 1.5 mm. long; racemes very many, capillary 44. *Leptochloa*
 46. Spikelets 2-3 mm. long; racemes up to 20, not capillary :
 47. Spikelets adaxial, i.e. the back of the upper floral glume facing the rachis 45. *Urochloa*
 47. Spikelets abaxial, i.e. the back of the upper floral glume turned away from the rachis and lower involucre glume facing the rachis 46. *Brachiaria*
 5. Inflorescence an open, pyramidal or contracted, narrow or lobulate panicle :
 48. Spikelets awned :
 49. Awns tripartite 47. *Aristida*
 49. Awns entire :
 50. Spikelets large, 2.5-3.3 cm. long 48. *Avena*
 50. Spikelets small, up to 0.7 cm. long :
 51. Panicles open; branches erect or spreading :
 52. Spikelets in groups at the ends of branches 49. *Sorghum*
 52. Spikelets in threes at the ends of branches 50. *Chrysopogon*
 51. Panicles close, lobulate or contracted :
 53. A tall grass; spikelets large; species cultivated 49. *Sorghum*
 53. Short grasses; spikelets small or minute; plants spontaneous :
 54. Involucre glumes awned 51. *Polypogon*
 54. Involucre glumes unawned 52. *Lophochloa*
 48. Spikelets unawned :
 55. Spikelets subtended by bristles 20. *Setaria*
 55. Spikelets not subtended by bristles :
 56. Spikelets spindle-shaped, with rows of prickles on the glumes 53. *Vetiveria*

56. Spikelets not prickly :
 57. Spikelets 1 to 2-flowered :
 58. Spikelets paired, one sessile, the other pedicelled
 49. *Sorghum*
 58. Spikelets all alike, sessile or pedicelled :
 59. Spikelets 8-12 mm. long; species cultivated
 54. *Oryza*
 59. Spikelets below 5 mm. in length; species wild :
 60. A swollen annular callus present at the base of the spikelet
 55. *Eriochloa*
 60. No swollen annular callus present at the base of the spikelet :
 61. Spikelets minute, about 1.5 mm. long:
 62. Spikelets distributed all over the branches; grains closely invested by the glume or palea
 44. *Leptochloa*
 62. Spikelets crowded in upper parts of branches which are bare below; grains free
 56. *Sporobolus*
 61. Spikelets not less than 2 mm.:
 63. Racemes usually 2-3 cm. long, dense; spikelets green or dark purple; glumes hispidulous
 57. *Arundinella*
 63. Racemes long, lax; spikelets green; glumes glabrous
 58. *Panicum*
 57. Spikelets more than 2-flowered :
 64. Floral glumes 1 to 3-nerved :
 65. Short grasses; upper involucre glume 3-nerved
 29. *Eragrostis*
 65. Tall grasses; upper involucre glume 5-nerved; species planted
 59. *Halopyrum*
 64. Floral glumes 5-nerved
 60. *Poa*

1. *Bambusa* Schreb. nom. cons.

Bambusa sp.

A shrubby or arborescent plant with stout rootstocks and forming dense clumps. Culms terete, green and shining when young, becoming golden-yellow with age. Leaves articulated on the sheath, flat, many-nerved.

Cultivated in gardens. Flowering and fruiting recently reported from Tughlak Road areas.

2. *Zea* Linn.

Z. mays Linn. Sp. Pl. 971, 1753; Duthie & Fuller, Field & Gard. Crops 1 : 21, t. 5.

An erect, robust, monoecious grass, up to 3 m. high. Leaves 30-45 × 2.5-12 cm., broad lanceolate, flat. Male panicles (tassefs) up to over 20 cm. long. Spikelets in pairs, one sessile, one pedicelled, 2-flowered; lower floret male or barren; upper floret male. Female spikes (cob) axillary, enclosed in the sheath of the leaf and surrounded by bracts. Spikelets sessile, in longitudinal rows. Grains crowded, shining.

Cultivated as a rainy season crop in villages.

Local name : Makki

Flowers and Fruits : Winter season

J. K. Maheshwari 10

3. *Apluda* Linn.

A. aristata Linn. Cent. Pl. 2 : 7, 1756; Duthie, Fod. Gr. 44, t. 29; Bor, Fl. As. 5 : 431.

A. mutica Linn. var. *aristata* Pilger in Engl. & Prantl, Nat. Pfam. (ed. 2) 14e : 130, 1945.

A. varia Hack. var. *aristata* Hack. in DC. Mon. Phan. 6 : 196, 1889; FBI. 7 : 150; Blatt. & McC. Bomb. Gr. 29, t. 20.

An erect, leafy, perennial grass, branching from the base. Culms many-noded, smooth, glabrous. Leaves up to 30 × 0.5-1.5 cm., linear-lanceolate, long-attenuate towards the base, almost petiolate, tapering above to a fine, setaceous point; midrib white above. Inflorescence a leafy panicle of very many, solitary, simple racemes or spikes, each enclosed in a spathe. Spikelets in trios, one sessile, two pedicelled, one of the pedicelled is reduced to a flat pedicel, the other is male. Sessile spikelet hermaphrodite; upper floral glume hyaline, cleft half way down, awned in the cleft.

Common in hedges and amongst bushes of gardens and waste places.

Flowers and Fruits : Sept.-Feb.

J. K. Maheshwari 493, near Kingsway Camp

4. *Iseilema* Anderss.

I. laxum Hack. in DC. Mon. Phan. 6 : 682, 1889; Duthie, op. cit. 43; FBI. 7 : 218; Blatt. & McC. Bomb. Gr. 113; Bor, Grasses Ind. 188.

An erect, ascending or often prostrate, perennial grass. Leaves linear, green or purplish, glabrous; margins scabrid; sheaths lax. Inflorescence

a long, narrow, racemiform panicle, of distant, axillary, pedunculate fascicles, interspersed with spathe-like bracts. Involucral spikelets whorled, pedicellate, male or neuter. Pedicelled spikelets on very slender pedicels, male or neuter, resembling the involucral. Sessile spikelets hermaphrodite; upper floral glume reduced to an awn.

Common in lawns and grassy playgrounds, where it forms a dense mantle with some legumes on the ground and acts as an efficient soil binder. Collected several times from the playground of police lines, near Kingsway Camp.

Flowers and Fruits : Sept.-Dec.

J. K. Maheshwari 492; 1252

5. *Miscanthus* Anderss.

M. nepalensis (Trin.) Hack. in DC. Mon. Phan. 6 : 104, 1889; FBI. 7 : 107; Bor, Fl. As. 5 : 311 & Grasses Ind. 196.

Eulalia nepalensis Trin. in Mém. Acad. Pétersb. (sér. 6) 2 : 333, 1832 & Spec. Gram. 3 : t. 332.

A tall, perennial grass. Culms slender, terete. Leaves linear, flat, rigid, green, glabrous. Racemes very many, densely crowded, spreading, flexuous, corymbose-fastigate, fulvous-haired. Spikelets golden-brown, shining, 2-nate at each node, all pedicellate, one long and the other shortly pedicelled, awned; hairs of callus much longer than spikelets, golden-brown.

Occurs on unused ground near Ghaziabad.

Flowers and Fruits : May-July

6. *Erianthus* Michx.

Awn of upper floral glume not or scarcely exerted from spikelets

Awn of upper floral glume distinctly exerted from spikelets *E. procerus*

. *E. ravennae*

E. procerus (Roxb.) Raizada in Ind. For. 80 : 41, 1954.

Saccharum procerum Roxb. Fl. Ind. 1 : 248, 1820; Bor, Fl. As. 5 : 321.

A tall grass. Culms solid, terete, glabrous, smooth. Leaves linear-lanceolate, tapering to a fine point; midrib occupying more than half the width of the blade at the base; margins very scabrid. Inflorescence a large, silvery panicle; rachis joints 5-7 mm. long; pedicels 2.5-3.5 mm. long. Sessile spikelets 3-4 mm. long. Callus furnished with hairs as long as or exceeding the spikelet. Lower involucral glume dorsally villous.

Collected from the low-lying areas near Najafgarh, on sandy soil along the 'bunds' of fields.

Flowers : April-June

J. K. Maheshwari 1214

- E. ravennae* (Linn.) Beauv. Agrost. 14, 1812; FBL 7 : 121; Stapf in Kew Bull. 208, 1907; Duthie, Gr. N.W. Ind. 15 & Fod. Gr. 26; Bor, Grasses Ind. 151.
Andropogon ravennae Linn. Sp. Pl. 1481, 1763.
Saccharum ravennae Linn. Syst. 88, 1774.

A large, tufted perennial, up to 4 m. tall. Culms solid, smooth, polished. Leaves variable in length, linear, acuminate, margins scabrid, Inflorescence a large, plumose panicle, 30-90 × 10-13 cm., silvery-silky, greyish or purplish. Joints and pedicels of the racemes long ciliate, with thickened tips. Spikelets paired, awned, one sessile and the other pedicellate, both alike; callus hairs purplish or brownish.
 Common on the ground along railway lines and canal banks in marshes, on unused ground near temporary ponds and ditches, and along the raised embankments around fields, etc. It is especially met in the trans-Jamuna area near Shahdara and Hindan River, where it grows in dense tufts. The fibre is used in making chairs, 'muddas', 'chappars' or temporary house-roofs and ropes.

Local name : Moonj; Sarkara
 Flowers and Fruits : Sept.-Jan.
 J. K. Maheshwari 510; 515; 549

7. *Saccharum* Linn.

Stems silky below the panicle
 Stems glabrous below the panicle *S. spontaneum*
 *S. officinarum*

S. spontaneum Linn. Mant. 183, 1771; Duthie, Gr. N.W. Ind. 15, Indig. Fod. Gr. 57 & Fod. Gr. 25; FBL 7 : 118; Blatt. & McC. Bomb. Gr. 45; Bor, Grasses Ind. 214.

A very variable, tall, perennial, densely tufted grass. Leaves very long, narrow-linear, acuminate, coriaceous. Flowering panicles 15-60 × 5-10 cm., conical or lanceolate to oblong; branches whorled, spreading or slightly ascending, with the callus hairs closely appressed to the branches; peduncle softly silky just below the panicle. Spikelets paired, one pedicellate, the other sessile, 1-flowered, hermaphrodite.

A very pernicious grass; common in unused ground, fallow fields, near canals, ponds and marshy places, and along areas on both sides of railway lines. It is eradicated by burning. The culms are extensively used in making 'chicks'. The foliage is used against frost for protection of vegetables growing in fields.

Local name : Kans ; Kana; Sarkanda
 Flowers and Fruits : Sept.-Dec.
 J. K. Maheshwari 420; 1253

S. officinarum Linn. Sp. Pl. 54, 1753; FBL 7 : 118; Blatt. & McC. op. cit. 46.

An erect, tall, many-noded grass, glabrous or with appressed hairs below the panicle, waxy at least below the nodes. Leaves rigid, linear-lanceolate, acuminate, spreading, drooping at the tip. Panicles pyramidal, very large, dense, spreading; primary branches verticillate or semi-verticillate, filiform. Spikelets lanceolate, surrounded by dense, silky white hairs.

Cultivated for its juicy culms.

Local name : Ikh

J. K. Maheshwari, cultivated

8. *Thysanolaena* Nees

T. maxima (Roxb.) Kuntze, Rev. Gen. 794, 1891; Bor, Fl. As. 5 : 176.

Agrostis maxima Roxb. Fl. Ind. 1 : 319, 1820.

Thysanolaena agrostis Nees in Edinb. N. Phil. Jour. 18 : 180, 1835; FBI. 7 : 61.

T. procera Mez in Bot. Archiv 1 : 27, 1922; Blatt. & McC. op. cit. 201.

A perennial, tall, handsome grass, 2-3.5 m. tall. Culms rounded, polished. Leaves large, broad lanceolate, many-nerved, 30-60 × 5-10 cm. Panicles large, soft, glabrous, of very numerous, erect or suberect, filiform branches which divide and subdivide, bearing numerous, minute spikelets. Spikelets acuminate, pedicellate. Involucral glumes subequal, hyaline. Lower floral glume lanceolate, empty; upper hermaphrodite, ovate, ciliate with long, erect, white hairs. Grains very minute.

Planted as an ornamental grass in hedges of gardens.

Flowers and Fruits : Nov.-Feb.

J. K. Maheshwari 795, Nicholson Gardens

9. *Phragmites* Trin.

P. maxima (Forsk.) Blatt. & McC. Bomb. Gr. 202, 1935.

Arundo maxima Forsk. Fl. Aegypt.-Arab. 24, 1775.

Phragmites karka Trin. ex Steud. Nom. 2 : 324, 1841; Bor, Gr. U.P. 179.

Arundo phragmites Linn. Sp. Pl. 81, 1753.

A tall, erect perennial, up to 3 m. tall. Culms hollow, terete, smooth. Leaves linear, acuminate, coriaceous, bifarious. Panicles large, erect, decompound; branches filiform, scaberulous. Spikelets several-flowered, hermaphrodite; callus densely clothed with long, silky hairs. Glumes glabrous. Caryopsis free, oblong.

Common in wet places near the banks of Okhla Lake, Hindan River and water ponds near Shahdara.

Flowers and Fruits : Winter season

J. K. Maheshwari 572

10. *Arundo* Linn.

A. donax Linn. Sp. Pl. 81, 1753; Duthie, Gr. N. W. Ind. 35 & Fod. Gr. 60; FBI. 7 : 302; Blatt. & McC. Bomb. Gr. 204; Bor, Grasses Ind. 413.

A tall, perennial grass with stout, erect culms, 3-6 m. high. Stems hollow, many-noded, green, glabrous and smooth. Leaves linear-lanceolate, tapering to a fine point, $30-60 \times 2.5$ cm.; Inflorescence a large, erect, terminal, plumose panicle, $30-60 \times 10$ cm.; branches scabrous, erect or drooping. Spikelets $8-10 \times 2$ mm., light brown, usually 2-flowered. Involucral glumes glabrous; floral ones long-hairy on the back in the lower half.

Cultivated for its hollow culms which are used in making pipes for children; often grown in hedges of gardens.

Local name : Narhal; Narsal

Flowers and Fruits : Sept.-Feb.

J. K. Maheshwari 512

11. *Eremopogon* Stapf

= *Dichanthium foecolatum*

E. strictus (Roxb.) A. Camus in Ann. Soc. Linn. Lyon (n.s.) 68: 208, 1922; Raizada in Ind. For. 80 : 45, 1954.

Andropogon strictus Roxb. Hort. Beng. 82, 1814, nom. nud. & Fl. Ind. 1 : 265, 1820.

An erect or decumbent, tufted, very slender grass, up to 60 cm. tall. Stems geniculately ascending; lower portion leafy. Nodes bearded. Leaves linear, up to 10 cm. long. Spikes solitary, about 5 cm. long, on long peduncles. Joints and pedicels with long, silky hairs. Spikelets paired, the sessile one bisexual, the pedicelled one male, both with a circular pit on the back of lower involucral glumes. Upper floral glume of the sessile spikelets passing into a geniculate awn. Pedicelled spikelets awnless.

A sporadic grass occurring in the hilly tracts. Common on uneven plateaux near Mehrauli in dry, gravelly, reddish-brown soils and in the neighbourhood of New Cantonment.

Local name : Zarga

Flowers and Fruits : July-Oct.

J. K. Maheshwari 1154; 1169, near Gurukul (Faridabad)

12. *Perotis* Ait.

P. indica (Linn.) Kuntze, Rev. Gen. 2 : 787, 1891; Blatt. & McC. Bomb. Gr. 220, t. 147; Bor, Grasses Ind. 611.

Anthoxanthum indicum Linn. Sp. Pl. 28, 1753.

Perotis latifolia Ait. Hort. Kew. 1 : 85, 1789; FBI. 7 : 98.

An annual, tufted grass with geniculate, suberect, ascending, glabrous stems terminating in inflorescences. Leaves short, $3.5 \times 0.7-1$ cm., ovate

or lanceolate from a broad amplexicaul base, glaucous. Racemes slender, crinite, spike-like, dense, purplish-violet. Spikelets narrowly linear, 1-flowered. Involucral glume long-awned. Grains almost cylindrical.

Common in wet, gravelly, unused places near temporary ponds and puddles. On unused ground near Najafgarh, it grows abundantly in sandy, damp situations.

Flowers and Fruits : July-Oct.

J. K. Maheshwari 285, near Okhla

13. *Heteropogon* Pers.

H. contortus (Linn.) Roem. & Schult. Syst. 2 : 836, 1817; Duthie, Gr. N.W. Ind. 19 & Fod. Gr. 32, t. 19; Blatt. & McC. Bomb. Gr. 109, t. 71; Bor, Grasses Ind. 163.

Andropogon contortus Linn. Sp. Pl. 1045, 1753; FBI. 7 : 199.

An erect or decumbent, tufted, slender perennial, about 1 m. high. Leaves linear, flat. Inflorescence a single, terminal raceme or more often several flowering branches. Spikelets closely imbricate, the lower ones awnless, male or neuter, the upper ones long-awned, female. Sessile, female spikelets hispid; upper floral glume reduced to an awn. Pedicellate spikelets hispid at the back with long, bulbous-based hairs.

Common on the Ridge and adjacent hilly tracts near Faridabad and Mehrauli. It is a very troublesome grass on account of the awns which get twisted together like the strands of a rope. It serves as a good fodder grass if used before flowering.

Local name : Daabsuli; Surbala

Flowers and Fruits : Oct.-Dec.

J. K. Maheshwari 1040

14. *Lolium* Linn.

L. temulentum Linn. Sp. Pl. 83, 1753; Bor, Fl. As. 5 : 66 & Grasses Ind. 546.

An erect annual, 30-100 cm. high. Culms tufted, solitary, swollen at the nodes. Leaves scabrous, linear, acute. Spikes erect, straight, with up to 30 spikelets. Spikelets 5 to 10-flowered. Florets all hermaphrodite. Lower involucral glume absent or hidden in the hollows of the continuous axis. Floral glumes elliptic-oblong, 5-nerved; awn subterminal, straight. Palea 2-keeled. Grains elliptic-oblong, grooved in front.

Common as a weed in moist places or comes mixed up in the fields of wheat, barley, etc. The grains are said to be poisonous.

Flowers and Fruits : Oct.-Feb.

J. K. Maheshwari 1062

15. *Tetrapogon* Desf.

GRAMINEAE

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Lower floral glume broadly cuneiform.
Lower floral glume ovoid, hirsute all over.

- T. tenellus* (Koen. ex Roxb.) Chiov. in Ann. Ist. Bot. Roma 8 : 352, 1908; Raizada in Ind. For. 80 : 36, 1954; Bor, Grasses Ind. 475.
Chloris tenella Koen. ex Roxb. Hort. Beng. 82, 1814, nom. nud. & Fl. Ind. 1 : 330, 1820; FBL 7 : 290; Achariyar, S. Ind. Gr. 259; Blatt. & McC. Bomb. Gr. 254.

An erect, weak annual, branching from the base. Leaves linear-lanceolate, acuminate, flaccid. Spikes usually solitary, erect, flat. Spikelets large, 7×4 mm., bifarious, 3 to 4-awned. Involucral glumes unequal; upper one shortly awned. Glumes of hermaphrodite floret broad cuneate, truncate, awned, paleate; the next or second floral glume smaller but similar; the other still smaller and awned. Grains oblong, lenticular. Common on the Ridge as well as in the neighbouring undulating tracts amongst the shrubs and in depressed places on gravelly soil.

Flowers and Fruits : July-Oct.

J. K. Maheshwari 340, Hauz Khas

- T. villosus* Desf. Fl. Atlant. 2 : 389, t. 255, 1799; Duthie, Gr. N.W. Ind. 33 & Fod. Gr. 55, t. 68; Bor, Grasses Ind. 475.

Chloris villosa Pers. Syn. 1 : 87, 1805; Aitchis. Cat. Punjab Pl. 67; FBL 7 : 291; Blatt. & McC. Bomb. Gr. 254.

A stout, tufted perennial with a woody base, 15-25 cm. tall. Leaves linear, acute, flat, rigid; ligule obscure. Spikes 1-3, erect. Spikelets obconic, with 4 unequal awns. Involucral glumes awned; upper one 2-toothed at the tip. Glumes of the hermaphrodite floret broad ovate or suborbicular, hirsute all over with long, silky hairs; the next glumes barren, hirsute; the next small, the last reduced to an awn.

Rare.

16. *Melanocenchris* Nees

- M. Jacquemontii* Jaub. & Spach, Ill. Pl. Or. 4 : 36, t. 325, 1851; Santapau in RBSI. 16(1) : 358, 1953; Bor, Grasses Ind. 473.

M. royleana Nees ex Steud. Syn. Pl. Glum. 218, 1854; Duthie, Gr. N.W. Ind. 33 & Fod. Gr. 54, t. 67.

Gracilea royleana Hook. f. in FBL 7 : 284, 1896; Blatt. & McC. Bomb. Gr. 248.

A small, slender, tufted annual, up to 15 cm. tall, spreading or ascending. Leaves linear-lanceolate, filiform, acutely pointed; margins distantly ciliate. Inflorescence up to 6 cm. long, of fascicles of cottony spikelets; rachis flexuous. Awns of involucral glumes longer than the glumes; awn of floral glume short. Grains oblong, brownish. Upper floral glume 3-toothed at the apex, paleate.

Common on the Ridge amongst stones and in the crevices in open, drier places and in shades of shrubs; also common in other gravelly and barren places of the district.

Flowers and Fruits : July-Oct.

J. K. Maheshwari 1046, Hauz Khas

17. *Triticum* Linn.

T. aestivum Linn. Sp. Pl. 85, 1753; Bor. Fl. As. 5 : 84; Blatt. & McC. Bomb. Gr. 279.

T. sativum Lamk. Fl. Fr. 3 : 625, 1778; Duthie, Gr. N.W. Ind. 45 & Fod. Gr. 68.

T. vulgare Vill. Hist. Pl. Dauph. 2 : 153, 1787; FBI. 7 : 367.

An erect, tufted annual. Leaves linear-lanceolate or broad linear, flat, acuminate. Spikes erect, curved at maturity, compact. Spikelets solitary, about 10×5 mm., laterally compressed, 3 to 5-flowered. Involucral glumes obtuse or shortly awned. Floral glumes mucous or 1 to 3-awned, hermaphrodite. Grains oblong, ventrally grooved, free within the floral glume and palea or adhering to the latter.

Cultivated as a rabi crop. A disease 'foot rot of wheat' due to *Fusarium* sp. causes considerable damage to crops in the seedling stage in the neighbourhood of Delhi.

Local name : Gehu

Flowers and Fruits : Jan.-March

J. K. Maheshwari 656

18. *Hordeum* Linn.

H. vulgare Linn. Sp. Pl. 84, 1753; Duthie, Gr. N.W. Ind. 45 & Fod. Gr. 69, t. F, f. 32; FBI. 7 : 371.

An erect, glabrous, annual grass, up to 120 cm. high. Leaves linear, elongate, 2-auriculate. Spikes erect at first, irregularly 4-sided. Spikelets in threes, about 10×4 mm., one-flowered or the lateral imperfect. Floral glume tapering into a long, straight or recurved awn. Grains ovoid, narrowly oblong, tightly enclosed and adhering the lemma and palea.

Cultivated as a rabi crop in the district.

Local name : Jow

Flowers and Fruits : Jan.-March

J. K. Maheshwari 1159

19. *Cenchrus* Linn.

Involucral bristles not spinose, the inner plumose, even if thickened below, the tips always filiform *C. ciliaris*

Involucral bristles spinose, tips not filiform;
 Base of involucre rounded; bristles all erect
 Base of involucre turbinate; bristles short, the outer spreading or
 recurved, inner ones hard, sharp and spiny

C. ciliaris Linn. Mant. 302, 1771; Raizada in Ind. For. 80:40, 1954; Bor.
 Grasses Ind. 287.

Pennisetum cenchroides Rich. in Pers. Syn. 1:72, 1805; Aitchis. Cat.
 Punjab Pl. 162; Duthie, Gr. N.W. Ind. 10; Achariyar, S. Ind. Gr.
 118.

P. ciliare Link, Hort. Berol. 1:213, 1827; Blatt. & McC. Bomb. Gr.
 181, t. 116.

A tufted, prostrate, erect or decumbent, much-branched perennial.
 Leaves linear, tapering to a fine point. Racemes cylindric, dense, pale
 or purplish, up to 15 × 1 cm. Involucels of 2 series of bristles, outer
 bristles numerous, fine, filiform; inner ones flattened and thickened at the
 base, ciliate, connate below into a ring. Spikelets oblong-lanceolate,
 3-1 in each involucel.

Common throughout in all types of soils and grows even in dry soils;
 often associated with *C. setigerus* Vahl, with which it forms a dense,
 herbaceous mat. Once established it is not easily killed out. Occurs on
 the Ridge amongst the bushes of *Capparis decidua* Edgew., and other
 thorny shrubs. Used as fodder.

Local name : Anjhan; Anjan

Flowers and Fruits : Major part of the year

J. K. Maheshwari 1; 1041; 1042

C. setigerus Vahl, Enum. 2:395, 1806; Raizada, loc. cit.

C. biflorus Hook. f. in FBI. 7:89, 1896 (non Roxb.).

An annual, tufted grass with erect or ascending, glabrous stems.
 Nodes knotted. Leaves linear-lanceolate, finely acuminate, rough with
 long, scattered hairs, 8-20 × 0.5-0.7 cm. Racemes solitary, cylindric,
 green at first, turning black at maturity. Involucels usually with 3
 spikelets; the outer row of bristles short, erect, the inner row erect, subu-
 late-lanceolate, all connate into a short cup. Spikelets ovate-oblong,
 2-flowered. Lower floret barren, upper hermaphrodite.

One of the most pernicious weeds; common on the Ridge as well as
 in other areas, often gregarious and growing in tufts on a wide range of
 habitats, usually on dry, sandy or gravelly soils and dominating the vege-
 tation of unused lawns. It is considered to be a good pasture grass.

Local name : Anjan; Kala anjan

Flowers and Fruits: During and after the rains

J. K. Maheshwari 40

C. biflorus Roxb. Fl. Ind. 1:238, 1820; FBI. 7:89; Duthie, Gr. N.W.

Ind. 9; Achariyar, op. cit. 121; Blatt. & McC. Bomb. Gr. 185, t. 118; Bor, Grasses Ind. 287.

C. catharticus Delile, Cat. Hort. Monsp. 1838, 4, 1839 & in Linnaea 13: Litt.-Bericht 103, 1839; FBI. 7: 90.

An erect or geniculately ascending, simple or branching grass. Leaves lanceolate, finely acuminate. Racemes 6-12 cm. long, solitary, cylindric. Involucels 2 to 1-flowered; bristles thick, lanceolate-subulate, erect, dorsally flattened, the outer short, spreading or reflexed, the inner of hard, sharp spines. Caryopsis ovoid-oblong, pale, rugulose.

Common in sandy or dry soil of waste ground, unused fields, etc. Also met along canal banks or in shallow water, where it grows partly submerged. The young plants are used as fodder.

Local name : Chirchitta; Anjhan; Bhurat

Flowers and Fruits : July-Oct.

J. K. Maheshwari 313, near Okhla

20. *Setaria* Beauv. nom. cons.

Bristles retrorsely barbellate *S. verticillata*

Bristles antrorsely barbellate :

Upper involucral glume as long as the upper floral glume, the latter quite smooth *S. viridis*

Upper involucral glume shorter than the upper lemma, the latter rugose :

Panicles interrupted, narrow, lobed *S. tomentosa*

Panicles spiciform, continuous, cylindric:

Spikelets 3 mm. long, upper floral glume broad, dorsally strongly curved on the back and slightly keeled upwards

. *S. glauca*

Spikelets 2.25 mm. long; upper floral glume narrow, dorsally gently curved and not at all keeled *S. pallidifusca*

S. verticillata (Linn.) Beauv. Agrost. 51, 1812; Aitchis. op. cit. 162; Duthie, Gr. N.W. Ind. 9; FBI. 7: 80; Blatt. & McC. op. cit. 174; Bor, Grasses Ind. 365.

Panicum verticillatum Linn. Sp. Pl. 82, 1762.

An annual grass. Culms erect, ascending, branching from the base, with a conspicuous channel on one side, variable in length. Leaves linear or linear-lanceolate, tapering to an acute point, 15-25 × 1-2 cm. Panicles spike-like, erect, straight or curved, cylindric or oblong. Bristles rough, one or more with reverse barbs or teeth. Spikelets ellipsoidal. Lower floret sterile; upper one hermaphrodite, elliptic-oblong, plano-convex, coriaceous. Stigmas purple.

Common on the Ridge as well as in other parts, growing amongst the shrubs in shady, moist areas.

Local name : Laptuna

Flowers and Fruits : During and after rains

J. K. Maheshwari 339

S. viridis (Linn.) Beauv. Agrost. 51, 178, t. 13, f. 3, 1812; Bor. Fl. As. 5: 287 & Grasses Ind. 365.
Panicum viride Linn. Syst. 870, 1759.

A tufted, weak, erect or ascending annual, branching from the base. Leaves linear-lanceolate, tapering to a fine point, flat; margins cartilaginous. Inflorescence an erect, oblong or linear-cylindric spike, 2-5 × 0.5 cm., greenish. Spikelets elliptic, deciduous. Grains broad elliptic. Found occasionally in marshy places.

Flowers and Fruits : Oct.-Feb.

J. K. Maheshwari 230, Shahdara

S. tomentosa (Roxb.) Kunth, Rév. Gram. 1 : 47, 1829; Raizada in Ind. For. 80: 40, 1954; Bor. Grasses Ind. 365.
Panicum tomentosum Roxb. Fl. Ind. 1 : 303, 1820.

Setaria intermedia Roem. & Schult. Syst. 2 : 489, 1817; FBI. 7 : 79; Blatt. & McC. Bomb. Gr. 174.

A loosely tufted annual. Culms geniculately ascending, glabrous, usually branching from base. Leaves linear or narrowly lanceolate, tapering to a fine point, thin, flaccid, 3-15 × 0.4-1.2 cm. Panicles linear to narrowly lanceolate, lax, interrupted, 4-10 × 1-2 cm., the upper branches reduced to sessile clusters or solitary spikelets supported by a bristle. Spikelets about 2 × 1.5 mm., ovate to elliptic. Upper floret fertile; floral glume boat-shaped, prominently transversely wrinkled, paleate.

Common in dried compound of bungalows and gardens as well as in moist localities near canals, ponds and ditches, often growing in abundance.

Flowers and Fruits : June-Feb.

J. K. Maheshwari 831; 1210

S. glauca (Linn.) Beauv. Agrost. 51, 1812; Aitchis. op. cit. 162; Duthie, Gr. N.W. Ind. 8; FBI. 7 : 78, in part.
Panicum glaucum Linn. Sp. Pl. 56, 1753.

A tufted, annual grass, up to 150 cm. high. Culms simple or branched, erect or ascending. Leaves linear-lanceolate, tapering to a fine point. Racemes spiciform, erect, dense, cylindric, variable in length, yellowish at maturity. Bristles 6-12. Spikelets 3 × 1.5 mm., broadly oblong or elliptic, 2-flowered, lower male or barren, upper hermaphrodite; fertile florets marked with numerous transverse ridges.

Common in cultivated soils and waste places, growing in tufts. It is found in wide variety of habitats. The cattle are fond of this grass and it is considered to be a good fodder.

Local name : Bandarighas
 Flowers and Fruits : May-Sept.
 J. K. Maheshwari 5 : 132; 709

S. pallidifusca Stapf & C. E. Hubb. in Kew Bull. 259, 1930; Bor, Fl. As. 5: 291 & Grasses Ind. 363.

An annual, tufted, smooth grass, usually 30-60 cm. high. Leaves linear, long-tapering to a fine point. Spikes erect, dense, continuous; branches reduced to involucre bristles, supporting a solitary, perfect spikelet. Spikelets 2.25 cm. long.

Common in wet situations near ponds, ditches, etc. It closely resembles *S. glauca* Beauv., from which it is difficult to separate.

Flowers and Fruits : Aug.-Oct.

21. *Pennisetum* Rich.

P. typhoides (Burm. f.) Stapf & C. E. Hubb. in Kew Bull. 271, 1933; Bor, Fl. As. 5: 297 & Grasses Ind. 350.

Alopecurus typhoides Burm. f. Fl. Ind. 27, 1768.

Pennisetum typhoideum Rich. in Pers. Syn. 1 : 72, 1805, in part; FBI. 7 : 82.

A tall, erect, stout annual, up to 3 m. high. Leaves 15-60 x 1-4 cm., linear to linear-lanceolate. Panicles spike-like, cylindric, very dense; rachis closely beset with the stalked, persistent involucre; involucre of numerous, ciliate bristles. Spikelets deciduous, oblong. Lower floret male or barren; upper hermaphrodite. Caryopsis obovoid or obovoid-ellipsoid, smooth, free.

Cultivated for its grain.

Local name : Bajra

Flowers and Fruits : Sept.-Oct.

J. K. Maheshwari 1458

22. *Tragus* Hall, nom. cons.

T. biflorus (Roxb.) Schult. Mant. 2 : 205, 1824; Bor, Fl. As. 5: 162.

Lappago biflora Roxb. Fl. Ind 1 : 284, 1820.

Tragus racemosus Hook. f. in FBI, 7: 97, 1896 (non Scop. 1777).

A tufted, prostrate, ascending or erect grass, up to 15 cm. tall, simple or branching, leafy below. Leaves linear-lanceolate, rigid, with pectinately ciliate margins. Racemes spike-like, solitary, terminal, 5 x 0.7 cm. Spikelets in groups of two, facing each other and appearing like a single spikelet with two, equal, echinate glumes, 1-flowered, 5 x 2 mm. Upper involucre glume with hooked spines along the ribs. Grains linear-oblong, pale brown.

Common on the Ridge in tufts on gravelly soils or amongst stones,

in open places or shades of shrubs; also grows in waste places and fields on yellowish-brown soils or in barren uplands and pasture ground.

Flowers and Fruits : July-Oct.
J. K. Maheshwari 260

23. *Imperata* Cyrill.

I. cylindrica (Linn.) Beauv. Agrost. 165, t. 5, f. 1, Expl. Planch. 5, 1812; Blatt. & McC. Bomb. Gr. 42, t. 30; Bor. Grasses Ind. 169.
Lagurus cylindricus Linn. Syst. 878, 1759.
Imperata arundinacea Cyrill. Pl. Rar. Neap. 2: 26, t. 11, 1792; Duthie, Gr. N.W. Ind. 14; FBI. 7 : 106.

An erect, simple, slender grass, 60 cm. or less in height, with creeping, stoloniferous rootstocks. Leaves linear, flat, acuminate; midrib white, very numerous, crowded, appressed. Fruiting panicles silvery-white, with wide-spreading, soft, callus hairs. Spikelets lanceolate. Anthers orange. Grains small, oblong.

Common in moist, public lawns and gardens, near ponds and canals, and as an undergrowth in fruit orchards, often becoming abundant and dominating the vegetation. From a distance it gives an appearance of a silvery-white carpet spread over the landscape. It is attacked by a smut.

Flowers and Fruits : June-Oct.

J. K. Maheshwari 1063, Roshanara Gardens

24. *Hemarthria* R. Br.

H. compressa (Linn. f.) R. Br. Prodr. 207, 1810; Blatt. & McC. Bomb. Gr. 31; Bor. Grasses Ind. 161.

Rottboellia compressa Linn. f. Suppl. 114, 1781; FBI. 7 : 153, in part.

A hygrophilous, perennial grass. Stems erect from a decumbent, rooting base, compressed, leafy. Leaves 5-12.5 × 0.3-0.5 cm., linear. Racemes erect, straight or curved; joints of the rachis thickened by the fusing of the pedicel. Sessile spikelets 4-5 mm. long; lower glume with a flat back, linear-oblong or oblong; upper one concave, membranous, closely applied and adnate to the excavation in the rachis; floral glumes hyaline. Pedicelled spikelets hermaphrodite or male.

Common in marshes, along borders or in paddy fields, canal banks and other moist places.

Flowers and Fruits : June-Sept.

J. K. Maheshwari 700, Najafgarh

25. *Oropetium* Trin.

O. thomaeum (Linn. f.) Trin. Fund. Agrost. 98, t. 3, 1820; Duthie, Gr.

N. W. Ind. 45; FBI. 7 : 366; Blatt. & McC. Bomb. Gr. 247; Bor. Grasses Ind. 474.

Nardus thomaea Linn. f. Suppl. 105, 1781.

A small, densely tufted, annual grass, 5-8 cm. tall. Root fibres capillary. Leaves erect or curved, narrowly linear-lanceolate, striate, ciliate with long hairs. Spikes 3.5×0.15 cm., erect, straight or slightly curved; rachis undulating. Spikelets 1-flowered, half-immersed in the distichous cavities of the rachis.

Common as well as abundant on the Ridge and adjacent hilly tracts during the monsoon period. It is a pioneer grass on the gravelly soils of the Ridge and is found especially in crevices of rocks and ridges; often associated with the liverwort *Riccia* sp. and producing dense tufts of plants. As the soil dries up, *Riccia* sp. dies leaving black patches and then this grass is met in a fruiting state, either alone or associated with *Cyperus triceps* Endl.

English name : Rock grass

Flowers and Fruits : July-Sept.

J. K. Maheshwari 1038

26. *Phalaris* Linn.

P. minor Retz. Obs. 3 : 8, 1783; Duthie, Gr. N.W. Ind. 25; Aitchis. Cat. Punjab Pl. 158; FBI. 1 : 221; Bor. Grasses Ind. 616.

An erect or decumbent annual. Culms branched; nodes swollen. Leaves glabrous, finely pointed, linear-lanceolate, $15-25 \times 0.7-1.2$ cm. Panicles spike-like, contracted, cylindric in outline, erect, 10×1.5 cm. Spikelets strongly laterally compressed, flattened, 1-flowered and with 1 or 2 reduced scales or imperfect glumes below the floral glumes. Empty glumes boat-shaped, strongly keeled; keel broadly winged. Floral glumes about half the length of empty glumes, keeled. Grains free.

Common in the fields of wheat, barley, etc. Used as an animal fodder.

Local name : Chiriya-bajra

Flowers and Fruits: Feb.-March

J. K. Maheshwari 602, Najafgarh fields

27. *Aeluropus* Trin.

A. lagopoides (Linn.) Trin. ex Thw. Enum. 374, 1864, sphalm. "*lagopodioides*"; Druce in Rep. Bot. Exch. Club Brit. Isles 603, 1917; Bor. Grasses Ind. 380.

Dactylis lagopoides Linn. Mant. 33, 1767.

Aeluropus villosus Trin. ex C.A. Mey. Verz. Pfl. Cauc. 18, 1831; FBI. 7: 334.

A rigid, perennial herb, with long, wiry roots. Stems 15-30 cm., densely tufted, hard, erect or prostrate, terminating in a naked, slender

peduncle. Leaves subulate-lanceolate or acicular. Spikelets in short, ovoid or oblong heads, crowded, villous with soft hairs. Glumes closely imbricate, ovate-oblong. Lower involucre glume hairy and with ciliate margins.

Collected on one occasion along the sandy banks of a stagnant water canal, near Model Town.

Flowers : June

J. K. Maheshwari 1098

28. *Eragrostiella* Bor

E. bifaria (Vahl) Bor in Ind. For. 66: 270, 1940 & Grasses Ind. 494; Santapau in RBSI, 16(1): 352, 1953.

Poa bifaria Vahl, Symb. Bot. 2: 19, 1791; Roxb. Fl. Ind. 1: 331, 1832.

Eragrostis bifaria Wt. ex Steud. Nom. 1: 562, 1840; FBl. 7: 325; Blatt. & McC. Bomb. Gr. 241.

An erect, densely tufted, perennial grass. Stems simple, glabrous. Leaves narrowly linear, acute, rigid, smooth; sheaths glabrous. Spikelets secund, distichously spreading in a long, simple, terminal spike. Glumes strongly 1-nerved, keeled, olive-grey or green. Involucral Palea with ciliate wings to the keel.

A new record from Delhi State. Common in the rocky tracts near Gurukul, Faridabad where it grows amongst the wet soil between boulders and similar rocky places. Also found on the New Delhi Ridge.

Flowers and Fruits : Aug.-Nov.

J. K. Maheshwari 1061; 1238

29. *Eragrostis* Beauv.

Rachilla of spikelets tough, persistent; floral glumes falling away from its base upwards :

Leaf margins glandular :

Lower involucre glume 1 to 3-nerved; upper 3-nerved

Involucral glumes 1-nerved *E. ciliaris*

Leaf margins eglandular : *E. poaeoides*

Spikelets versatile, about 2 cm. long, narrowly linear; branches of panicles solitary *E. tremula*

Spikelets not versatile, small, 4 mm. long or less; mouth of leaf sheaths bearded *E. pilosa*

Rachilla of spikelets more or less jointed and breaking up from above downwards :

Panicles short, compact, spike-like, cylindric, about 2 cm. long *E. ciliaris*

Panicles longer, open or more or less contracted ;
Stamens 3; paleas ciliolate on the keels ;

Plants viscous, sweet-scented

Plants not viscous, not sweet-scented

Stamens 2; paleas scaberulous or smooth on the keels

E. viscosa

E. tenella

E. diarrhena

E. cillianensis (All.) Link ex Lutati in Malpighia 18: 386, 1904; Bor, Fl.

As. 5: 98; Blatt. & McC. Bomb. Gr. 237, t. 157.

Poa cillianensis All. Fl. Pedem. 2: 246, t. 91, f. 2, 1785.

Eragrostis major Host, Gram. Austr. 4: 14, t. 24, 1809; FBI. 7: 320.

Briza eragrostis Linn. Sp. Pl. 70, 1753.

An annual grass, up to 90 cm. tall. Culms erect or geniculate, branched, leafy. Leaves up to 20×0.8 cm., glandular along the margins. Panicles erect, ovate-oblong, open; branches spreading or suberect, capillary. Spikelets longer than their pedicels, $1.2 \times 0.3-0.4$ cm., many-flowered. Paleas with ciliolate keels. Grains globose, reddish-brown. Common on the Ridge and in the plains during the monsoon period.

Flowers and Fruits : May-Oct.

J. K. Maheshwari 1064

E. poaeoides Beauv. Agrost. 162, 1812; Duthie, Gr. N.W. Ind. 38; Aitchis. Cat. Punjab Pl. 170; Sprague & C. E. Hubb. in Kew Bull. 17, 1933; Bor, Grasses Ind. 512.

Poa eragrostis Linn. Sp. Pl. 68, 1753.

Eragrostis minor Host, Gram. Austr. 4: 15, 1809 (in nota) & Flor. Austr. 1: 135, 1827; Blatt. & McC. Bomb. Gr. 238, t. 158.

An annual, tufted grass, 15-45 cm. tall. Leaves linear; margins definitely glandular; sheaths bearded at the mouth. Panicles ovate to oblong; branches spreading when mature. Spikelets narrowly oblong, pale green or purplish, longer than the pedicels, $8-15 \times 2$ mm. Rachilla persistent. Grains about 0.5×0.4 mm., brown, rounded.

Common throughout during the monsoon period on moist soils.

Flowers and Fruits : July-Oct.

J. K. Maheshwari 1310

E. tremula Hochst. ex Steud. Syn. Pl. Glum. 269, 1854; FBI. 7: 320; Blatt. & McC. Bomb. Gr. 239, t. 159; Stewart, Gr. N.W. Ind. 422.

Poa tremula Lamk. Tabl. Encycl. 1: 185, 1791.

A tufted, erect or ascending annual, 15-60 cm. tall. Leaf margins eglandular. Panicles very diffuse; branches solitary, filiform, ascending. Spikelets $10-20 \times 2-3$ mm., narrowly linear; branchlets with long, white hairs in all axils of the panicles. Floral glumes broad ovate, 3-nerved. Grains nearly globose.

A common grass near Najafgarh in fallow and cultivated fields, on

damp, sandy, yellowish-brown soil, easily recognizable by its versatile spikelets. Used as fodder.
 Local name : Dholphulio
 Flowers and Fruits : Aug.-Nov.
 J. K. Maheshwari 1319

E. pilosa (Linn.) Beauv. Agrost. 71, 1812; Duthie, loc. ult. cit.; Aitchis. Cat. Punjab Pl. 170; Blatt. & McC. Bomb. Gr. 241, t. 160; Stewart, loc. cit.; Bor, Grasses Ind. 512.
Poa pilosa Linn. Sp. Pl. 68, 1753.

A densely tufted, annual grass. Culms geniculate, usually erect, soft, 30 cm. high. Leaves narrowly linear, scabrous on the margins; sheaths bearded. Panicles erect or inclined, spreading at anthesis; nodes hairy; branches capillary, flexuous; pedicels almost as long as the spikelets. Spikelets erect, $3-5 \times 1$ mm., linear or narrowly ovate, 4 to 10-flowered. Floral glumes 3-nerved, the lateral nerves fading above the middle. Keel of palea subdenticulate. Anthers violet. Grains obovoid or ellipsoid.

Common in wet places or near margins of ponds and canals or in marshy places.

Local name : Kiwai
 Flowers and Fruits: May-Nov.
 J. K. Maheshwari 1226; 1283

E. ciliaris (Linn.) R. Br. in Tuckey, Narr. Exp. Congo App. 478, 1818; Bor, Grasses Ind. 506.
Poa ciliaris Linn. Syst. 875, 1759.

An erect or bent, slender annual, about 10 cm. high. Culms geniculately ascending, glabrous. Leaves very narrow. Panicles compact, short, 2 cm. or so, cylindric, spike-like, hairy due to the presence of long cilia on palea; branches divided from base. Spikelets pale, densely aggregated, 6 to 12-flowered, strongly compressed. Floral glumes about 1 mm. long, spreading.

Common in sandy soil of cultivated fields, waste ground and in moist, sandy-loamy soil near canal banks, etc. Var. *clarkei* Stapf ex Hook. f., is also reported from Delhi by J. D. Hooker (1896) and Bor (1960).

Local name : Panghas
 Flowers and Fruits : During and after rains
 J. K. Maheshwari 1433

E. viscosa (Retz.) Trin. in Mém. Acad. Pétersb. (sér. 6) 1 : 397, 1831; Blatt. & McC. Bomb. Gr. 233; Bor, Gr. U.P. 127, Fl. As. 5: 95 & Grasses Ind. 515.

Poa viscosa Retz. Obs. 4 : 20, 1786.

Eragrostis tenella Roem. & Schult. var. *viscosa* Stapf in FBI. 7: 315, 1896.

A tufted, sweet-scented grass, 12-30 cm. tall. Stems and rachis of panicle, pedicels and glumes with scattered, minute glands. Leaves flat or convolute, erect, with rigid tips. Panicles dense, cylindric or oblong, feathery; branches numerous, more or less spreading. Spikelets often purplish, rachilla readily breaking up. Grains pale brown, polished.

Common in damp places. It much resembles *E. tenella* Roem. & Schult. which, however, is not viscous.

Flowers and Fruits : May-Oct.

E. tenella (Linn.) Roem. & Schult. Syst. 2 : 576, 1817; FBI. 7 : 315; Blatt. & McC. Bomb. Gr. 232; Bor, Grasses Ind. 513.

Poa tenella Linn. Sp. Pl. 69, 1753.

An erect or geniculately ascending, tufted annual, 15-30 cm. tall. Culms glabrous, smooth. Leaves narrowly linear, tapering to a fine point. Panicles plumose, loose and open or contracted, green or purplish. Spikelets 2-4 × 1 mm., oblong; rachilla breaking up from above downwards. Paleas ciliate on the keels.

Common and abundant during the monsoon period on moist soil, especially in open places.

Flowers and Fruits : May-Oct.

J. K. Maheshwari 12

E. diarrhena (Schult.) Steud. Syn. Pl. Glum. 266, 1854; Bor, Grasses Ind. 507.

Poa diarrhena Schult. Mant. 3 : 616, 1827.

Eragrostis interrupta var. *diarrhena* Stapf ex Hook. f. in FBI. 7 : 316, 1896.

A tufted, erect, slender grass, from a geniculate and ascending base. Leaves slender, narrow, flat. Panicles contracted, long, narrow, of appressed or shortly spreading, numerous, fascicled or subwhorled, spiculate branches giving the panicle a lobed appearance. Spikelets very minute, often purplish or pinkish in colour, ovate to linear. Floral glumes obtuse.

Common in dry places or damp soil near banks of rivers and ponds. The colour of the inflorescence and the angle at which the inflorescence branches spread is very variable.

Local name : Lamp

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 1057

30. *Alopecurus* Linn.

A. nepalensis Trin. ex Steud. Syn. Pl. Glum. 148, 1854; Stewart, Gr. N.W. Ind. 436 ; Bor, Grasses Ind. 393.

A prostrate or ascending, densely tufted grass. Culms slender. Leaves glabrous, linear. Inflorescence dense, cylindric, tapering toward the apex, erect or slightly nodding, green or purplish. Spikelets oblong to elliptic-oblong, closely imbricate. Glumes ciliate on the keels. Awn absent. Grains laterally compressed, free.

Collected once from near a dirty water ditch in village Uzirpur.

Flowers and Fruits : Feb.

J. K. Maheshwari 1058

31. *Alloteropsis* Presl emend. Hitch.

A. cimicina (Linn.) Stapf in Prain, Fl. Trop. Africa 9 : 487, 1919; Blatt. McC. Bomb. Gr. 129, t. 83.

Milium cimicinum Linn. Mant. 184, 1771.

Axonopus cimicinus Beauv. Agrost. 12, 1812; FBI. 7 : 64.

An annual, erect or decumbent grass. Culms and leaf margins clothed with long, horizontal cilia. Nodes somewhat swollen. Leaves ovate-lanceolate, acute; cilia bulbous-based. Racemes spike-like, 4-5, borne on the top of a slender, hairy peduncle. Spikelets solitary or clustered, 3-5 × 2 mm., ovate or elliptic, awned, erect. Upper involucral glume with long, purplish hairs on the marginal nerves. Floral glume of the upper floret with a short, stout awn.

Occurs sporadically in moist, stony ridges and fissures; collected from the area near Gurukul, Faridabad.

Flowers and Fruits : July-Sept.

J. K. Maheshwari 1244

32. *Chloris* Sw.

Empty glumes above the floret solitary, well developed or rudimentary :

Empty glumes represented by a fine arista; spikes long, slender, awned *C. dolichostachya*

Empty glumes oblanceolate, truncate *C. virgata*

Empty glumes above the floret 2 or 3 :

Spikelets 3 mm. long *C. gayana*

Spikelets 2.5 mm. long *C. barbata*

C. dolichostachya Lagasca, Gen. & Spec. Pl. 5, 1816; Bor, Grasses Ind. 466.

C. incompleta Roth, Nov. Pl. Sp. 60, 1821 ; FBI. 7 : 290.

A perennial grass with erect or procumbent stems up to 1 m. tall, often branched. Leaves linear. Inflorescence of generally 5, digitate, spreading spikes forming a terminal whorl. Spikelets awned, many, 5 × 1 mm., imbricate, 2-rowed, secund, lanceolate, closely appressed. Upper involucral glume produced into a very short awn. Lower floral glume with a median awn up to 9 mm. long; callus bearded; upper glume rudimentary.

Common on the Ridge as well as in other parts in moist or wet, shady places.

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 777

C. virgata Sw. Fl. Ind. Occ. 1 : 203, 1797; FBl. 7 : 291; Achariyar, S. Ind. Gr. 260; Blatt. & McC. Bomb. Gr. 255, t. 170

Rhabdocoloa virgata Beauv. Agrost. 84, 1812.

An erect, tufted, leafy grass, also with creeping stems, rooting below. Stems somewhat flattened. Leaves narrowly linear. Spikes 6-15, erect, digitate; young ones enclosed in an inflated sheath. Spikelets 2-rowed, with 4 glumes. Upper involucral glume awned. Lower floral glume bifid at the apex, awned, long-ciliate on the margins in the upper half almost to the tip. Rachilla shortly produced bearing a well developed, auricled, awned glume. Caryopsis polished, trigonous.

Common in fallow and cultivated fields and unused places near gardens on dry soil.

Flowers and Fruits : June-Oct.

J. K. Maheshwari 1129

C. gayana Kunth, Rév. Gram. 1 : 89, 293, t. 58, 1829; Bor, Fl. As. 5 : 123; Blatt. & McC. Bomb. Gr. 258.

An erect or geniculately ascending, simple or branched annual or perennial, 60-120 cm. tall. Culms glabrous, smooth. Leaves linear, long-tapering to a fine point. Spikes 6-15, 9-12 × 0.4 cm., umbellate, sessile, suberect, greenish or brownish. Spikelets 3 × 1.5 mm., shortly 2-awned. Involucral glumes very unequal. Lowest floret hermaphrodite; glume 2-toothed, ciliolate along the marginal nerves and shortly bearded below the tip or glabrate, awned. Upper floret barren.

Occurs in waste places near gardens and along roadsides. Cultivated in the fields of I.A.R.I., for fodder.

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 1408

C. barbata (Linn.) Sw. Fl. Ind. Occ. 1 : 200, 1797; Aitchis. Cat. Punjab Pl. 167; Duthie, Gr. N.W. Ind. 33; FBl. 7 : 292; Achariyar, op. cit. 264; Blatt. & McC. Bomb. Gr. 256; Bor, op. cit. 124.

Andropogon barbatus Linn. Mant. 302, 1771.

A tufted, perennial grass, ascending from the geniculate, creeping base, proliferously branched. Leaves narrowly linear. Spikes 5-20, 4-8 × 0.5 cm., suberect, digitately arranged in a terminal fascicle. Spikelets secund, 2.5 × 1.5 mm., 3-awned; rachilla produced bearing two, small, awned, barren glumes. Involucral glumes lanceolate. Lowest floret hermaphrodite; glume broad elliptic, densely bearded on the margins above the middle, awned.

Common on pasture ground and in cultivated fields, especially on sandy soils.

Flowers and Fruits : Aug.-Oct.

33. *Paspalum* Linn.

P. distichum Linn. Syst. 855, 1759; Bor. Fl. As. 5 : 255 & Grasses Ind. 338.

A moisture-loving, perennial, rhizomatous grass. Stolons long, forming loose mats. Culms erect or decumbent. Leaves linear, ascending, glabrous. Racemes 2, sometimes 3 or more, terminal, erect, later spreading or reflexed. Spikelets solitary, distichous, $2.5-3.5 \times 2$ mm., broadly elliptic, abruptly acute, ascending and appressed on the rachis. Lower involucreal glume absent. Caryopsis elliptic, depressed-convex.

Common near the banks of Hindan River, Najafgarh Drain, Okhla Canal and near ponds and puddles.

Flowers and Fruits : June-Sept.

J. K. Maheshwari 306

34. *Digitaria* Heist. ex Fabr.

Spikelets bearded with soft, spreading hairs

D. adscendens

Spikelets not bearded

D. setigera

D. adscendens (H.B. & K.) Henr. in Blumea 1 : 92, 1934; Bor in Webbia 11 : 350, 1955 & Grasses Ind. 298.

Panicum adscendens H.B. & K. Nov. Gen. & Sp. 1 : 97, 1815.

Digitaria fimbriata Link, Hort. Berol. 1 : 226, 1827.

D. marginata Link var. *fimbriata* (Link) Stapf in Prain, Fl. Trop. Africa 9 : 440, 1919.

D. sanguinalis (Link) Scop. var. *marginata* (Link) Fern. in Rhodora 22 : 103, 1920.

An erect or decumbent, annual grass, up to 100 cm. tall. Leaves linear to linear-lanceolate. Spikes 2 or more. Spikelets oblong, acute, appressed to the rachis, binate, pedicel of one row shorter than the other. Upper involucreal glume ciliate. Floral glume densely bearded with soft, spreading hairs; hairs at first dull white, turning brownish later.

A common grass occurring throughout on all types of soils, dry or moist. It is easily recognizable by its conspicuously bearded spikelets.

Flowers and Fruits : July-Oct.

J. K. Maheshwari 1143, canal near Najafgarh

D. setigera Roth apud Roem. & Schult. Syst. 2 : 474, 1817; Bor in Webbia 11 : 344, 1955 & Grasses Ind. 305.

D. corymbosa (Roxb.) Merr. Enum. 1 : 53, 1923.

D. ciliaris

Panicum corymbosum Roxb. Hort. Beng. 7, 1814, nom. nud.

Digitaria extensa (Hook. f.) Henr. in Blumea 1 : 100, 1934.

Panicum extensum Nees & Arn. in Wt. Cat. n. 2340, 1833, nom. nud.

An annual, tall, tufted grass. Culms smooth, glabrous. Leaves linear to linear-lanceolate, up to $20 \times 1-2$ cm., rough. Racemes subdigitately arranged on a short common axis; rachis narrowly winged. Spikelets elliptic, 2-3 mm. long. Lower involucral glume a small hyaline scale or obsolete. Lower floret sterile; upper hermaphrodite; floral glume chartaceous.

Common in waste places near fields and along roadsides.

Local name : Kiwai

Flowers and Fruits : July-Oct.

J. K. Maheshwari 1060

35. *Cynodon* Rich. ex Pers. nom. cons.

C. dactylon (Linn.) Pers. Syn. 1 : 85, 1805; Duthie, Gr. N.W. Ind. 32; FBI. 7 : 288; Blatt. & McC. Bomb. Gr. 250, t. 166; Bor, Gr. U.P. 110, t. 22 & Fl. As. 5 : 125.

Panicum dactylon Linn. Sp. Pl. 58, 1753.

A perennial grass with an extensively creeping base. Culms slender, many-noded, wiry, forming matted tufts. Leaves linear, acuminate, $3-10 \times 0.2-0.4$ cm. Spikes 4-5, digitate, arcuate-spreading, green or purplish. Spikelets laterally compressed, sessile, appressed, imbricate. Floral glumes boat-shaped.

Common and abundant, forming a carpet in lawns; extensively used as lawn grass. Used as cattle fodder.

Local name : Doob

Flowers and Fruits : Major part of the year

J. K. Maheshwari 516

36. *Eleusine* Gaertn.

Prostrate or creeping grasses, rooting at the nodes; spikes digitate *E. compressa*

Erect grasses :

Spikes digitate

Spikes scattered or whorled

E. indica

E. verticillata

E. compressa (Forsk.) Aschers. & Schwfth. ex C. Christensen in Dansk Bot. Archiv 4 : No. 3, 12, 1922; Bor, Grasses Ind. 492.

Panicum compressum Forsk. Fl. Aegypt.-Arab. 18, 1775.

Eleusine flagellifera Nees in Linnaea 16: 220, 1842; FBI. 7 : 294.

A prostrate, long-spreading, proliferously branched perennial. Stems smooth, stiff, rooting at the distant, thickened, leafy nodes and putting

forth slender branches. Internodes 10-20 cm. long. Leaves 2-4 x 0.2-0.3 cm., rigid. Spikes 3-6, digitate; rachis flexuous. Spikelets imbricate, 4 to 6-flowered. Upper involucral glume aristate. Floral glumes ovate. Palca oblong, keels ciliate.

Common in sandy soil near Jamuna River and on the Ridge and adjoining hilly tracts near Faridabad, Mehrauli, where it spreads profusely in open, dry places or amongst the thorny shrubs. The plant throws aerial runners in all directions and spreads very quickly. Asses seem to like it and hence its local name.

Local name : Gadaghas ; Chimbar

Flowers and Fruits : July-Oct.

J. K. Maheshwari 903

E. indica (Linn.) Gaertn. Fruct. 1 : 8, 1788; Aitchis. Cat. Punjab Pl. 168; Duthie, op. cit. 34; Blatt. & McC. Bomb. Gr. 259; Bor, Fl. As. 5 : 108 & Grasses Ind. 493.

Cynosurus indicus Linn. Sp. Pl. 72, 1753.

An erect annual, 30-60 cm. high, simple or branched. Culms glabrous, somewhat compressed. Leaves distichous, flat or folded; sheaths ciliate. Spikes 2-7, elongate, digitate with 1 or 2 below the umbel, suberect or subrecurved; rachis flattened. Spikelets biserial, secund, pointing forward at an acute angle, 3 to 6-flowered. Grains oblong, obtusely trigonous.

Common along the edges of fields, on pastures and roadsides.

Flowers and Fruits : July-Oct.

J. K. Maheshwari 732, Najafgarh

E. verticillata Roxb. Fl. Ind. 1 : 346, 1820; Aitchis. loc. cit. ; Duthie, op. cit. 34; FBI. 7 : 295.

An annual. Culms tufted, erect, 30-60 cm. high, simple or branched. Leaves linear, lanceolate, about 20 x 1.5 cm. or more; margins subdenticulate. Spikes 6-20, scattered or whorled, suberect, with numerous, close spikelets. Spikelets 6 to 12-flowered, 4-7 x 3 mm., shining. Empty glumes unequal; keels subdenticulate; upper one acuminate or aristulate. Grains oblong, rugose.

Common and sometimes abundant on the Ridge in depressions and shades of bushes and also in the plains in waste places, along roadsides and in cultivated fields on dry, sandy soil.

Local name : Makra

Flowers and Fruits : July-Oct.

J. K. Maheshwari 248

37. *Dactyloctenium* Willd.

Annuals; spikes 1.3-3.8 cm. long *D. aegyptium*

Perennials; spikes 0.6-1.3 cm. long *D. indicum*

D. aegyptium (Linn.) Beauv. Agrost. 72, 1812; Blatt. & McC. Bomb. Gr. 262, t. 176; Bor. Gr. U.P. 112, t. 23, Fl. As. 5 : 110 & Grasses Ind. 489.

Cynosurus aegyptius Linn. Sp. Pl. 72, 1753.

Eleusine aegyptia Desf. Fl. Atlant. 1 : 85, 1798 ; Duthie, Gr. N.W. Ind. 34; FBI. 7 : 295.

An erect or decumbent annual, variable in habit. Culms rooting at the base and from the branched nodes. Leaves distichous, narrowly linear, flat. Spikes 2-6, digitately radiating; rachis keeled. Spikelets densely crowded, spreading at right angles to the rachis, 3-5 × 3 mm. Lower involucral glume cuspidate; upper awned. Floral glumes mucronate or awned. Grains obovoid-globose, rugose.

Common during the monsoon period on the Ridge in depressions and amongst bushes and shrubs and as a weed in cultivated fields and open places, often becoming abundant. Erect, prostrate and decumbent types are known from the area.

Local name : Makra

Flowers and Fruits : May-Oct.

J. K. Maheshwari 4

D. indicum Boiss. Diagn. Pl. Orien. (sér. 2) fasc. 4 : 131, 1859; Blatt. & McC. Bomb. Gr. 264; Bor. Grasses Ind. 489.

Eleusine indica Duthie, Fod. Gr. 58, 1888.

E. aristata Ehrenb. ex Boiss. Fl. Oriens. 5 : 557, 1884; FBI. 7 : 296.

A dwarf, slender, prostrate, perennial grass, proliferously branched. Stems rooting at the distant, thickened, woody, leafy nodes. Leaves linear, ciliate with bulbous-based hairs. Spikes 2-6, 6-13 mm. long. Floral glumes ovate, cuspidate, keeled. Grains ovoid, rugose.

Common in sandy places, forming a thick tuft of plants matted with the soil.

Flowers and Fruits : July-Sept.

J. K. Maheshwari 325, near Okhla

38. *Paspalidium* Stapf

P. flavidum (Retz.) A. Camus in Lecomte, Fl. Gén. Indo-Chine 7 : 419, 1922; Blatt. & McC. Bomb. Gr. 141, t. 90; Bor. Gr. U.P. 172, t. 44, Fl. As. 5 : 258 & Grasses Ind. 333.

Panicum flavidum Retz. Obs. 4 : 15, 1786; FBI. 7 : 28.

A tufted annual, 30-75 cm. long. Culms geniculately ascending or erect, branched. Leaves 5-25 × 0.5-1.2 cm., thin, ascending, linear-lanceolate. Inflorescence a panicle of 6-9, false, sessile, distant, erect spikes, appressed to the main axis, recurved. Spikelets closely imbricate, secund

double-rowed, $2-3 \times 2$ mm., ovate or elliptic, plump, glabrous. Lower
 floret usually barren; upper hermaphrodite. Stigmas purplish. Common along canal banks and ponds on wet, sandy soil.

Flowers and Fruits : May-Oct.

J. K. Maheshwari 697, Roshanara Gardens

39. *Echinochloa* Beauv.

Lower involucreal glume and upper floral glume equally acute or cuspidate
 Lower involucreal glume and upper floral glume cuspidate or produced
 into an awn, the latter more than the former

E. colonum (Linn.) Link, Hort. Berol. 2 : 209, 1833; Bor, Gr. U.P. 122,
 t. 27, Fl. As. 5 : 246 & Grasses Ind. 308.
Panicum colonum Linn. Syst. 870, 1759 & Sp. Pl. (ed. 2) 84; FBI. 7 :
 32.

An annual, erect or geniculately ascending, simple or branched grass,
 up to 60 cm. tall. Leaves $10-20 \times 0.4-0.8$ cm., linear or lanceolate. Spikes
 8-20, sessile, simple, suberect and often appressed to the axis, usually
 distant. Spikelets crowded, $3-3.5 \times 1.5$ mm., globose ovoid. Grains
 plano-convex.

Common along canal banks, near ponds and in cultivated fields ;
 also found on the Ridge in moist, sandy places.

Local name : Dhelari

Flowers and Fruits : June-Oct.

J. K. Maheshwari 6

E. crusgalli (Linn.) Beauv. Agrost. 53, 1812; Blatt. & McC. Bomb. Gr.
 150, t. 95; Bor, Fl. As. 5 : 247 & Grasses Ind. 310.

Panicum crusgalli Linn. Sp. Pl. 56, 1753; FBI. 7 : 30, in part.

An annual. Culms 1 m. or so in length, decumbent or shortly creeping
 below, simple or branched. Leaves $10-20 \times 0.5-1$ cm., linear; margins
 finely cartilaginous; ligule absent. Panicles erect, 5-12 cm. long; branches
 solitary or binate, suberect or spreading, distant except the upper ones or
 more or less lobed in appearance. Spikelets crowded, $3-3.8 \times 2$ mm.,
 ovate-elliptic, cuspidate or awned, greenish or tinged with purple. Lower
 floret barren; floral glume cuspidate or produced into a long, flexuous
 awn. Upper floret hermaphrodite, polished. Grains broadly elliptic.

Common in the fields of sugarcane and other rainy season crops grown
 in Najafgarh and Timarpur. Also met along irrigation channels and
 canal banks. Used as cattle fodder.

Local name : Sama ; Samak

Flowers and Fruits : July-Nov.

J. K. Maheshwari 107; 443; 1054; 1055

40. *Oplismenus* Beauv.

A small, diffuse grass; awns barbellate, capillary . . . *O. burmannii*
 A tall, branching grass; awns smooth, viscid, filiform . . . *O. compositus*

O. burmannii (Retz.) Beauv. Agrost. 54, 1812; FBI. 7 : 68; Blatt. & McC. Bomb. Gr. 154, t. 97; Bor. Gr. U.P. 158, Fl. As. 5: 263 & Grasses Ind. 317.

Panicum burmannii Retz. Obs. 3 : 10, 1783.

A prostrate or procumbent, slender annual, 15-45 cm. long. Leaves 2.5 × 0.6-1.3 cm., ovate or ovate-lanceolate, elliptic-oblong. Spikes secund, close, in short panicles with distant, spicate branches. Spikelets about 2.5 × 1 mm. Involucral glumes and lower floral glume awned.

Common and abundant, forming a dense carpet or herbaceous undergrowth in moist, shady areas of gardens and other similar places along canal banks.

Flowers and Fruits : June-Dec.

J. K. Maheshwari 1045

O. compositus (Linn.) Beauv. Agrost. 54, 1812; FBI. 7 : 66; Blatt. & McC. Bomb. Gr. 152, t. 96; Bor. Gr. U.P. 157, t. 42 A., Fl. As. 5: 262 & Grasses Ind. 317.

Panicum compositum Linn. Sp. Pl. 57, 1753.

A procumbent or suberect annual, rooting below, 30-120 cm. long. Leaves ovate to ovate-lanceolate, acuminate, 5-15 × 1.2-2 cm., flat. Spikelets distant, in panicles with distant branches, about 4 × 1.5 mm. Lower involucral glume awned.

Common and abundant along with *O. burmannii* Beauv., forming a dense, herbaceous undergrowth in moist, shady places of the fruit orchards. The grass is attractive due to reddish or purplish-coloured stigmas.

Flowers and Fruits : Sept.-Jan.

J. K. Maheshwari 1044, near Jamuna Bridge

41. *Bothriochloa* Kuntze

B. pertusa (Linn.) A. Camus in Ann. Soc. Linn. Lyon (n.s.) 76 : 164, 1931 ; Bor. Fl. As. 5 : 368 & Grasses Ind. 109.

Holcus pertusus Linn. Mant. 301, 1771.

Andropogon pertusus Willd. Sp. Pl. 4 : 922, 1806.

Amphilophis pertusa Nash ex Stapf in Agric. News W. Ind. 15 : 179, 1916; Blatt. & McC. Bomb. Gr. 84, t. 54.

A slender, erect or geniculately ascending perennial. Nodes bearded with spreading hairs. Leaves linear. Racemes subdigitately fasciculate, silky, whitish, pale or dull purplish; joints and pedicels densely ciliate. Sessile spikelets 3-4 × 1 mm., oblong-lanceolate; lower involucral glume with a deep pit above the middle; upper floral glume reduced to an awn. Pedicelled spikelets male or neuter, not awned.

A very variable grass; common in public and private lawns, pastures, stony crevices and on very dry soil.
 Flowers and Fruits : July-Oct.
 J. K. Maheshwari 1056

42. *Dichanthium* Willem.

D. annulatum (Forsk.) Stapf in Prain, Fl. Trop. Africa 9: 178, 1917; Blatt. & McC. Bomb. Gr. 94, t. 62; Bor. Gr. U.P. 116, t. 25, Fl. As. 5: 371 & Grasses Ind. 133.
Andropogon annulatus Forsk. Fl. Aegypt.-Arab. 173, 1775; FBI. 7: 196.

An erect or ascending, densely tufted, perennial grass, up to 1 m. tall. Nodes usually bearded. Leaves linear, setaceous-acuminate. Racemes 3 or often more; joints and pedicels silky-hairy. Sessile spikelets hermaphrodite, closely imbricate, $3-5 \times 1$ mm.; upper floral glume reduced to a slender awn. Caryopsis plano-convex, obovate-oblong. Pedicellate spikelets male or neuter.

Very common throughout, especially on cut lawns and pastures, in hedges and on roadsides. When grazed it puts forth prostrate shoots. It is often confused with *Bothriochloa pertusa* A. Camus, but is easily recognized by the absence of the pit in the lower glume. Used as cattle fodder and horses seem to like it.

Local name : Zarga; Barlu; Apang
 Flowers and Fruits : Cold and summer seasons
 J. K. Maheshwari 743; 1066

43. *Desmostachya* Stapf

D. bipinnata (Linn.) Stapf in Dyer, Fl. Cap. 7: 632, 1900; Blatt. & McC. Bomb. Gr. 244, t. 162; Stewart, Gr. N. W. Ind. 423; Bor. Grasses Ind. 491.

Briza bipinnata Linn. Syst. 875, 1759.

Uniola bipinnata Linn. Sp. Pl. 104, 1762.

Eragrostis cynosuroides Beauv. Agrost. 162, 1812; FBI. 7: 324.

A perennial, tall grass, branching from the base. Culms 30-150 cm. high, tufted, smooth, erect. Leaves linear to linear-lanceolate, rigid, with filiform tips, up to 40×1 cm.; margins hispid. Panicles 15-55 cm. long, narrowly pyramidal or columnar, reddish-brown or brown at maturity. Spikes many, short, up to 2.5 cm. long, crowded. Spikelets sessile, secund, 2-seriate, deflexed.

Common and abundant in the Khadar tract, in fallow fields, unused ground, along roadsides and boundaries of fields, and on dry or little wet, sandy, yellowish-brown soils, often growing in dense tufts and

producing a dominating patch of plants. Occurs in the saline tracts of Delhi in association with *Sporobolus marginatus* Hochst., and *Alhagi pseudalhagi* Desv. The culms are used for making brooms.

Local name : Daab; Dhab
Flowers and Fruits : June-Oct.
J. K. Maheshwari 151

44. *Leptochloa* Beauv.

L. panicea (Retz.) Ohwi in Bot. Mag. Tokyo 55: 311, 1941; Bor, Grasses Ind. 517.

Poa panicea Retz. Obs. 3 : 11, 1783.

Leptochloa filiformis Hook. f. in FBI, 7 : 298, 1896; Duthie, Gr. N.W. Ind. 192; FBI, 7 : 298.

An annual, geniculately ascending, slender grass. Culms 30-90 cm. high, glabrous, many from a common base. Leaves up to 25×1 cm., flat, finely acuminate. Panicles 10-20 cm. long, contracted or diffuse; branches very many, capillary. Spikes $3-10 \times 0.2-0.3$ cm., ascending or spreading. Spikelets very small, 2 to 4-flowered.

Common in moist situations near canals and ponds.

Flowers and Fruits : June-Sept.
J. K. Maheshwari 887; 1059

45. *Urochloa* Beauv.

U. panicoides Beauv. var. *pubescens* (Kunth) Bor, Grasses Ind. 372, 1960.
Urochloa pubescens Kunth, Rév. Gram. 1 : 31, 1829.

An annual, tufted grass, erect or geniculately ascending. Leaves linear to linear-lanceolate, pale or yellowish-green; base wider, semi-amplexicaul. Inflorescence of 4-7, erect or spreading, spiciform, secund racemes. Spikelets $3-4 \times 2$ mm., ovate to elliptic-oblong, very acute, pubescent. Involucral glumes dissimilar; lower one clasping at the base.

Common along canal banks and on pasture ground.

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 1249, near Najafgarh Drain

46. *Brachiaria* Griseb.

Spikelets densely crowded, 2.5-3 mm. long; sheath nodes usually long-haired; culms stout *B. mutica*

Spikelets loose or if crowded, less than 2.5 mm.; sheath nodes glabrous or pubescent; culms slender :

Spikelets 1.5-2.5 mm. long; rachis triquetrous *B. reptans*

Spikelets 2.5-4 mm. long; rachis triquetrous or flattened

Spikelets 5-many, turgid *B. ramosa*

Spikelets 2-4, not turgid *B. distachya*

B. mutica (Forsk.) Stapf in Prain, Fl. Trop. Africa 9 : 526, 1919; Blatt. & McC. Bomb. Gr. 134, t. 86 ; Bor, Fl. As. 5 : 272; Blatt. & McC. Bomb. Gr. 134.

Panicum muticum Forsk. Fl. Aegypt.-Arab. 20, 1775.
A stout, branched perennial. Culms geniculate at the base, ascending, compressed, striate, glabrous; nodes covered with long, white hairs. Leaves 15-25 \times 1.2-1.6 cm., spreading, linear or linear-lanceolate, scaberulous. Panicles of 8-20, false spikes or racemes, erect or obliquely spreading. Spikelets densely crowded in more than 2 rows, 2.5-3 mm. long, ovate-acute or oblong. Involucral glumes dissimilar. Stigmas blackish-purple.

Grown as a fodder grass in the fields of I.A.R.I., also spontaneous.

English name : Para grass

J. K. Maheshwari 1413

B. reptans (Linn.) Gard. & C. E. Hubb. in Hook. Ic. Pl. sub t. 3363, 1938; Bor, Fl. As. 5 : 276 & Grasses Ind. 285.
Panicum reptans Linn. Syst. 870, 1759.

P. prostratum Lamk. Tabl. Encycl. 1 : 171, 1791.

A creeping or rambling annual. Culms geniculately ascending, rooting at the nodes, branched, with pubescent, knotty nodes. Leaves lanceolate to ovate, amplexicaul, thin, 2.5-6 \times 0.5-1.6 cm.; margins thickened, whitish. Panicle of 5-9 racemes, first erect, later spreading. Spikelets pale, paired, crowded, 2 \times 1 mm., ovate-acute or ellipsoid, glabrous. Lower involucral glume nerveless; upper 7-nerved. Floral glume mucronulate, finely transverse wrinkled.

Common in cultivated and fallow fields and on unused ground.

Flowers and Fruits: July-Sept.

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B. ramosa (Linn.) Stapf in Prain, Fl. Trop. Africa 9 : 542, 1919; Blatt. & McC. Bomb. Gr. 134, t. 86 ; Bor, Fl. As. 5 : 277 & Grasses Ind. 284.

Panicum ramosum Linn. Mant. 29, 1767; FBI. 7 : 36, in part.

An annual with erect or ascending stems, branching from the base, up to 60 cm. high. Leaves 5-12 \times 0.5-1.3 cm., linear-lanceolate, from a round, often clasping base. Panicles 5-15 cm. long, subpyramidal; rachis terminating in a spikelet. Racemes 5-10 or more, straight or flexuous, erect or spreading. Spikelets alternate, 3 \times 2 mm., ovoid, close or distant, often in pairs, one sessile and the other pedicellate, pubescent. Lower floret neuter; upper one hermaphrodite. Floral glume and palea transversely rugose. Caryopsis broad elliptic.

Common throughout the moist localities during and after rains. It is a good fodder grass.

Local name : Makraghas

Flowers and Fruits : June-Oct.

J. K. Maheshwari 3

B. distachya Stapf in Prain, Fl. Trop. Africa 9: 565, 1919; Bor, Fl. As. 5: 281 & Grasses Ind. 281.

Panicum distachyum Linn. Mant. 183, 1771.

A slender, glabrous grass, 30-60 cm. high, hairy at the nodes. Leaves erect or spreading, linear-lanceolate, rounded or amplexicaul at the base. Spikes 2-4, erect, at last spreading. Spikelets elliptic-obovate, glabrous, solitary.

Met along the margins of fields.

47. *Aristida* Linn.

Involucral glumes not awned *A. adscensionis*

Involucral glumes awned :

Spikelets 16 mm. long *A. setacea*

Spikelets 10 mm. long *A. hystrix*

A. adscensionis Linn. Sp. Pl. 82, 1753; FBI. 7: 224; Blatt. & McC. Bomb. Gr. 209, t. 138; Bor, Grasses Ind. 407.

A slender, erect or ascending, simple or branched grass, 20-60 cm. high. Leaves narrowly linear, up to 30 × 0.2 cm. Inflorescence a lax, narrow, linear, spike-like panicle, usually interrupted; branches erect or nodding, filiform. Spikelets 7-8 × 1 mm. long (excluding the awn), erect, green; mature ones turning purplish. Involucral glumes acute. Floral glumes laterally compressed; awn tripartite, central one longer than the laterals. Caryopsis as long as the glume.

Common and abundant on the Ridge in dry, gravelly soils and depressions and also in cultivated fields and near canal banks, forming dense tufts in local patches.

Local name : Lamp

Flowers and Fruits : July-Oct.

J. K. Maheshwari 1067

A. setacea Retz. Obs. 4: 22, 1786; Duthie, Gr. N.W. Ind. 27; FBI. 7: 225; Blatt. & McC. Bomb. Gr. 211, t. 139; Bor, Grasses Ind. 412.

An erect or geniculately ascending, filiform grass, 60-90 cm. high. Stems smooth, polished. Leaves 15-30 × 0.2-0.4 cm., coriaceous, smooth. Panicles inclined, open or contracted; branches filiform or capillary, usually fascicled and erect. Involucral glumes awned. Floral glumes 16 × 1 mm. long; awns 3, subequal or the middle one the longest; callus bearded with long hairs.

As common as *A. hystrix* Linn. f., on the Ridge in dry places.

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 1265

A. hystrix Linn. f. Suppl. 113, 1781 (non Thunb.); Roxb. FL Ind. I : 350, 1832; FBl. 7 : 225; Bor, Grasses Ind. 410.
Chaetaria hystrix Beauv. Agrost. 30, 1812.

A diffuse, ascending, filiform perennial with a creeping rootstock. Leaves narrowly lanceolate-linear, very finely acuminate. Panicles effuse; rachis stout, flexuous, straw-coloured or purplish. Spikelets (excluding awns) 10 mm. long.

A xerophytic grass. Common on the Ridge in dry, stony and open gravelly places, often forming dense, troublesome tufts for a long distance.

Local name : Balurighas

Flowers and Fruits : Aug.-April

J. K. Maheshwari 660, Hauz Khas

48. *Avena* Linn.

A. sterilis Linn. var. *culta* ; Raizada in Ind. For. 80 : 36, 1954.
A. sativa auct. (non Linn.).

An erect, polished annual, 120 cm. high. Culms simple, moderately stout, fistular. Leaves linear-lanceolate, 40-50 × 2 cm.; ligules prominent. Spikelets in large, lax, terminal, open panicles, hanging from one side, 25-33 × 4-5 mm., usually 2 to 3-flowered; top of rachilla like a peculiar 'sucker-mouth' shape. Florets all bisexual, one awned at the base and one or two awnless florets above or with all the florets awnless. Involucral glumes strongly several nerved, the lower becoming white as the grain ripens. Grains tightly enclosed by the floral glume and palea, free, silky.

Cultivated during the cold season for fodder in Timarpur and other parts as a pure or mixed crop.

In most of the Indian floras the commonly cultivated species of oat grown in India is erroneously called *Avena sativa* Linn., which is cultivated in the temperate climates of Northern Europe. Bosc (1929) has pointed out that the species cultivated in India is identical with the species *A. byzantina* C. Koch, grown in the Mediterranean Region and later introduced and cultivated in many parts of the world. This species now bears the correct name of *A. sterilis* Linn. var. *culta*.

Local name : Jai

Flowers and Fruits : Jan.-March

J. K. Maheshwari 600

49. *Sorghum* Moench nom. cons. prop.

Panicles usually open; rachis of spikes fragile; species wild *S. halepense*
 Panicles usually close and dense; rachis of spikes tenacious; species cultivated *S. vulgare*

S. halepense (Linn.) Pers. Syn. 1 : 101, 1805; Duthie, Gr. N.W. Ind. 23; Blatt. & McC. Bomb. Gr. 55, t. 37; Bor, Gr. U.P. 200, t. 60 & Grasses Ind. 222.

Holcus halepensis Linn. Sp. Pl. 1047, 1753.

Andropogon halepensis Brot. Fl. Lus. 1 : 89, 1804; FBI. 7 : 182.

A perennial, tall grass. Leaves linear-lanceolate. Inflorescence a decompound panicle, brown and purplish in colour, 15-30 cm. long; branches 1 to 3-nate, distant, diffuse. Spikelets borne at the tops of the branches and branchlets, green or purplish, brown and polished at maturity, 5×2 mm. Sessile spikelets hermaphrodite; pedicellate ones male or neuter.

Common as a weed in cultivated and fallow fields; also found in hedges and along banks of canals. Used as fodder.

Local name : Baru

Flowers and Fruits : Sept.-Nov.

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S. vulgare Pers. Syn. 1 : 101, 1805; Blatt. & McC. Bomb. Gr. 58.

Andropogon sorghum Brot. Fl. Lus. 1 : 88, 1804; FBI. 7 : 183.

Holcus sorghum Linn. Sp. Pl. 1047, 1753.

A tall, stout, annual grass. Leaves broad linear. Panicles dense, thyrsiform, decompound, with crowded whorls of erect branches and branchlets. Spikelets large, broad, hairy; pedicellate ones usually neuter.

Cultivated as a food crop in the urban parts.

Local name : Jawar

Flowers and Fruits : Sept.-Oct.

J. K. Maheshwari 11

50. *Chrysopogon* Trin. nom. cons.

Plants small, 30-60 cm. high; spikelets acicular; callus of sessile ones as long as the spikelets *C. aciculatus*

Plants stouter, over 90 cm. high; callus not nearly as long as the spikelet *C. fulvus*

C. aciculatus (Retz.) Trin. Fund. Agrost. 188, 1820; Duthie, Gr. N.W. Ind. 22 (*acicularis*); Bor, Fl. As. 5: 357; Blatt. & McC. Bomb. Gr. 68.

Andropogon aciculatus Retz. Obs. 5 : 22, 1788; FBI. 7 : 188.

An erect or ascending, perennial grass with a woody, creeping rhizome; lower internodes very short, the upper elongate. Leaves densely tufted, linear; margins spinulose. Panicles erect, pale green or purplish, narrow; branches fragile, filiform, spreading. Spikelets in threes, awned, one sessile, hermaphrodite, $3-4 \times 1$ mm.; the two lateral male or neuter, pedicellate, $4-5 \times 1$ mm.; peduncle hairy and fulvously bearded at the top. Caryopsis linear.

Occurs in waste places and pastures. It is a pest on account of its small awns which stick to the clothes.

Flowers and Fruits : Aug.-Oct.

J. K. Maheshwari 1227, University Campus

C. fulvus (Spreng.) Chiov. Fl. Somalia 1 : 327, 1929; Bor, Grasses Ind. 116.
Pollinia fulva Spreng. Pugill. 2 : 10, 1815.
Andropogon monticolus Schult. Mant. 3 : 665, 1827.

A tall, densely tufted, perennial grass. Culms erect, simple or branched, often very slender, straw-coloured. Leaves narrow, linear; margins scabrid. Panicles open, ovate or cylindrical; rachis slender; branches capillary, whorled, spreading; tip oblique, brown-bearded and bearing solitary raceme of a single, sessile, hermaphrodite and two, pedicellate, male spikelets. Spikelets nodding, $4-7 \times 2$ mm. Sessile spikelets laterally compressed; lower involucral glume 2-toothed at the apex which is produced into two, small, unequal awns; upper glume awned up to 1 cm. Pedicelled spikelets dorsally compressed; pedicels less than half the length of the sessile spikelet.

A characteristic, drought-resistant grass of the 'Kohi' or hilly area. Common on the Ridge and adjacent hilly tracts in gravelly crevices, amongst stone fissures and on steep slopes in crevices, often growing amongst the bushes of *Adhatoda vasica* Nees. It grows well in light soils and is relished by cattle.

Local name : Zarga; Dhawalu

Flowers and Fruits : During and after rains

J. K. Maheshwari 258

51. *Polypogon* Desf.

P. monspeliensis (Linn.) Desf. Fl. Atlant. 1 : 67, 1798; Duthie, Gr. N.W. Ind. 30; FBI. 7 : 245; Blatt. & McC. Bomb. Gr. 207; Bor, Grasses Ind. 403.

Alopecurus monspeliensis Linn. Sp. Pl. 61, 1753.

An annual, tufted grass, stout or slender, from a geniculate base, glabrous. Leaves ovate-lanceolate, $3-6 \times 0.6$ cm., scabrid; sheaths often swollen. Panicles spike-like, dense, cylindric, somewhat light green, lobulate, silky. Spikelets minutely pubescent, very shortly pedicelled, about 2×1 mm. Involucral glumes subequal, ciliate, awned. Floral glume broadly ovate-truncate, awned. Palea oblong, tip notched. Ovary ovoid.

Common during winter and early summer in sandy or silty beds of Jamuna River and its banks, in garden lawns, garden beds and cultivated fields. Also found on the Ridge in sandy soils.

Flowers and Fruits : Jan.-June

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52. *Lophochloa* Reichb.

L. phleoides (Vill.) Reichb. Fl. Ger. Excurs. 42, 1830; Bor. Grasses Ind. 445.

Festuca phleoides Vill. Fl. Delph. 1: 7, 1785.

Koeleria phleoides Pers. Syn. 1: 97, 1805; FBI. 7: 309.

An erect or ascending, annual grass, 30-60 cm. high. Leaves erect, flat, glabrous or hairy, acuminate. Panicles 10-15 × 1-2 cm., narrow, contracted or lobulate. Spikelets 3 to 7-flowered, about 5 × 1 mm. Involucral glumes unequal, shorter than the floral ones; keels scabrid. Floral glumes 2-fid, shortly awned in the sinus.

Common in the University lawns and near edges of garden beds, growing alone or mixed with *Polypogon monspeliensis* Desf.

Flowers and Fruits: Feb.-April

J. K. Maheshwari 935; 1387

53. *Vetiveria* Lem.-Lisanc.

V. zizanioides (Linn.) Nash in Small, Fl. S.E.U.S. 67, 1903; Blatt. & McC. Bomb. Gr. 65, t. 40; Bor. Gr. U.P. 216, t. 64, Fl. As. 5: 355 & Grasses Ind. 258.

Phalaris zizanioides Linn. Mant. 183, 1771.

Andropogon squarrosus Hook. f. in FBI. 7: 186, 1896 (non Linn. f.).

A densely tufted, perennial grass. Rootstocks with spongy, aromatic roots. Culms stout, up to 150 cm. tall, usually sheathed all along. Leaves erect, rigid. Panicles oblong, usually contracted; whorls of branches 4-12 with up to 20 rays. Racemes slender. Sessile spikelets 4-5 × 1.5 mm., linear or lanceolate, yellowish, later turning to violet-brown, purplish or black. Involucral glumes muriculate on the back. Pedicelled spikelets with the lower involucral glume tubercled on the back and upper tubercled on the keel.

Occurs along the banks of Okhla and Najafgarh Canals and other tributaries of Jamuna River. Often cultivated for its fragrant roots that give an aromatic and medicinal 'oil of vetiver'. The well known 'Khas-khas' mats, handfans and temporary house-roofs are made from it.

Local name: Gandar; Jhaund

Flowers and Fruits: July-Nov.

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54. *Oryza* Linn.

O. sativa Linn. Sp. Pl. 333, 1753; Duthie, Gr. N.W. Ind. 12; FBI. 7: 92; Blatt. & McC. Bomb. Gr. 274, t. 187; Bor. Fl. As. 5: 170 & Grasses Ind. 605.

An annual grass up to 1.5 m. tall or more. Leaves linear-acuminate, 30-60 × 0.6-0.8 cm., striate, 1-nerved. Inflorescence a lax, erect panicle,

finally nodding. Spikelets 7-10 × 3 mm., ovate-oblong or ovoid, erect, awned or not. Floral glumes hispid-ciliate, dorsally spinescently ciliate. Caryopsis oblong, angular, tightly enclosed in the lemma and palea. Cultivated along or in the canal of Najafgarh and Hindan.

Local name : Chauval

Flowers and Fruits : Sept.-Nov.

J. K. Maheshwari 448

55. *Eriochloa* H. B. & K.

E. procera (Retz.) C.E. Hubb. in Kew Bull. 256, 1930; Raizada in Ind. For. 80 : 40, 1954.

Agrostis procera Retz. Obs. 4 : 19, 1786.

Eriochloa polystachya Hook. f. in F.B.I. 7 : 20, 1896 (non H. B. & K.); Bor. Grasses Ind. 312.

An erect, tufted, leafy grass, 30-150 cm. tall. Roots fibrous. Culms glabrous, swollen and pubescent at the nodes. Leaves linear or lanceolate. Panicles erect, of several, alternate, suberect spikes. Spikelets erect, laxly imbricate, distichous, shortly pedicellate, 2.5-3.5 × 1.5 mm., ovate-lanceolate, velvety, falling entire from the pedicels. Lower involucre glume absent; upper silky hairy. Caryopsis oblong, smooth.

Common in moist or wet places near canals, ponds and ditches.

Flowers and Fruits : Oct.-Dec.

J. K. Maheshwari 885, Azadpur

56. *Sporobolus* R. Br.

Involucral glumes both shorter than the floral glume; branches of the panicle solitary or fascicled *S. diander*

Lower involucre glume shorter than the upper and floral glumes :

Panicles contracted, spike-like *S. tremulus*

Panicles open, effuse :

Annuals; spikelets ovate-lanceolate, acuminate *S. coromandelianus*

Perennials from a woody base; spikelets oblong *S. marginatus*

S. diander (Retz.) Beauv. Agrost. 26, 1812; Aitchis. Cat. Punjab Pl. 165 Duthie, Gr. N.W. Ind. 29; F.B.I. 7 : 247; Blatt. & McC. Bomb. Gr. 221, t. 148; Bor. Gr. U. P. 202. Fl. As. 5:117 & Grasses Ind. 629 *Agrostis diandra* Retz. Obs. 5 : 19, 1788.

An erect, slender, tufted annual. Nodes glabrous. Leaves flat or convolute, smooth, strongly nerved. Panicles narrowly pyramidal, turning purplish-brown and finally brown; branches capillary, erect or spreading, in scattered fascicles or racemed. Spikelets small, 1-1.5 × 0.5

mm., very shortly pedicelled. Grains truncate, obtusely quadrangular, reddish-brown, rugulose.

Common on the Ridge in gravelly soil amongst the shades of shrubs or in depressions and also on moist, pasture ground, along roadsides and on unused places. Used as fodder for horses.

Local name : Doob

Flowers and Fruits : July-Nov.

J. K. Maheshwari 253, Ridge ; 1043, Hauz Khas

S. tremulus (Willd.) Kunth, Rév. Gram. 1 : 67, 1829 & Enum. 1 : 210, Suppl. 166; FBL 7 : 250; Bor. Grasses Ind. 633.

Agrostis tremula Willd. Sp. Pl. 1 : 372, 1797 (excl. syn.).

Sporobolus geniculatus Nees ex Aitchis. Cat. Punjab Pl. 165, 1869.

An erect, prostrate or ascending, tufted, perennial grass. Stems flexuous. Leaves short, rigid, narrowly linear. Panicles narrow, subspiciform, interrupted with erect branches. Spikelets crowded, articulate on very short pedicels, glabrous. Glumes 1-nerved. Grains oblong.

Common in moist, sandy soils and along grassy banks of ponds.

Local name : Koilpatti

Flowers and Fruits : Aug.-Oct.; March

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S. coromandelianus (Retz.) Kunth, Rév. Gram. 1 : 68, 1829; Bor. Grasses Ind. 627.

Agrostis coromandeliana Retz. Obs. 4 : 19, 1786.

A densely tufted annual. Stems 10-30 cm. long, erect, ascending or prostrate, copiously leafy below. Leaves linear-lanceolate, with tubercle-based hairs towards the base. Panicles pyramidal, erect; branches capillary, horizontally spreading, in whorls of 3-6; branchlets very close, appressed. Spikelets small. Grains compressed, smooth.

Common in all types of soils during the monsoon months.

Flowers and Fruits : July-Oct.

S. marginatus Hochst. ex A. Rich. Tent. Fl. Abyss. 2 : 397, 1851; Bor. Grasses Ind. 632.

An erect, perennial grass with a woody base. Flowering branches stout or slender, 15-60 cm. high. Leaves narrowed from the rounded base to the tip, flat, minutely ciliate-serrulate. Panicles pyramidal, open, effuse; branches whorled, horizontally ascending, nodding, capillary. Spikelets minute, about 2×1 mm., spindle-shaped, somewhat flexuous, 1-flowered, crowded and subsessile at the ends of branches. Lower involucral glume much shorter than the upper, nerveless. Floral glumes ovate, 1-nerved. Paleas hyaline, often splitting from the middle axis.

A common grass of dry habitats along roadsides and *usar* or saline

lands; often found in association with the lime-loving plants like *Suaeda fruticosa* Forsk., and *Salsola baryosma* Dandy.
 Flowers and Fruits : May-Oct.
 J. K. Maheshwari 1220

57. *Arundinella* Raddi

A. benghalensis (Spreng.) Druce in Rep. Bot. Exch. Club Brit. Isles 605, 1917; Bor. Fl. As. 5: 185 & Grasses Ind. 421.
Panicum benghalense Spreng. Syst. 1: 311, 1824.

Arundinella wallichii Nees ex Steud. Syn. Pl. Glum. 114, 1854.

An erect, stout grass, up to 1 m. tall. Culms smooth, glabrous. Leaves lanceolate. Inflorescence an erect, elongate panicle, up to 30 cm. long; branches stout, spiciform. Spikelets 3 to 4-seriate, ovoid, secund, densely imbricate, setose, stoutly pedicelled, dark purple. Involucral glumes unequal. Lower floral glume oblong, paleate, staminate; upper one hermaphrodite, narrowed into a short awn.

Rare. Grows in tufts in waste places.

Flowers and Fruits : July-Oct.
 J. K. Maheshwari 324

58. *Panicum* Linn.

Upper floral glume finely transversely rugose *P. maximum*

Upper floral glume quite smooth :

Lower involucral glumes cuspidate-acuminate *P. trypheron*

Lower involucral glume not cuspidate-acuminate :

Spikelets long, narrowly lanceolate, acuminate; leaves broad *P. paludosum*

Spikelets oblong, ovate-oblong to elliptic or ovoid, acute or obtuse:

Annual, erect, leafy grasses; spikelets solitary or in pairs *P. miliare*

Perennials; spikelets laxly clustered on the branches *P. antidotale*

P. maximum Jacq. Coll. 1: 76, 1786 & Ic. 1: t. 13; Aitchis. op. cit. 159; FBI. 7: 49; Bor. Fl. As. 5: 224 & Grasses Ind. 327; Blatt. & McC. Bomb. Gr. 161, t. 103.

A perennial, densely tufted grass. Culms erect, usually stout, simple or branched. Leaves glabrous, softly hairy or coarse-hirsute with tubercle-based hairs, linear to linear-lanceolate; margins scaberulous to spinulously scabrid. Panicles erect or nodding, contracted or open, decompound; lower branches whorled, suberect or spreading; pedicels capillary, flexuous. Spikelets 3-4 × 1.5-2 mm., oblong. Lower floret male; upper hermaphrodite.

Introduced from Africa. Cultivated in the fields of I.A.R.I.

Flowers and Fruits : Nov.-April

J. K. Maheshwari 1405

P. trypheron Schult. Mant. 2 : 244, 1824; FBI. 7 : 47; Blatt. & McC. Bomb. Gr. 158; Bor. Grasses Ind. 331.

An erect or geniculate, tufted annual, 30-90 cm. high. Leaves flat, thin, linear. Panicles 10-30 cm. long, effuse, erect or nodding; rachis slender, filiform, scaberulous. Spikelets distant, $2.5-3 \times 1.5$ mm., ovoid, glabrous, acuminate, green or purple. Involucral glumes unequal, ovate. Lower floret barren, glume broad ovate; upper one hermaphrodite.

Common on cultivated lands, borders of cultivated fields, pasture lands and in marshes.

Flowers and Fruits : Dec.-Feb.

J. K. Maheshwari 1116, Shahdara

P. paludosum Roxb. Hort. Beng. 8, 1814, nom. nud. & Fl. Ind. 1 : 310, 1820; Blatt. & McC. Bomb. Gr. 162; Bor. Gr. U.P. 166, Fl. As. 5 : 229 & Grasses Ind. 329.

P. proliferum Hook. f. in FBI. 7 : 50, 1896 (non Lamk.).

A perennial, simple or branched, leafy grass, ascending from a creeping or spongy rootstock. Leaves linear or ensiform, flat, glabrous, $15-30 \times 0.6-1.5$ cm., many-nerved. Panicles at first contracted, then spreading; branches fasciculate below. Spikelets almost parallel to the axis, solitary or in pairs, 3-4 mm. long, ovate-lanceolate. Lower involucral glume one-fourth the length of the upper.

Grows in marshy places and along banks of rivers, canals and tanks.

Flowers and Fruits : June-Oct.

P. miliare Lamk. Tabl. Encycl. 1 : 173, 1791; Aitchis. op. cit. 159; Duthie, Gr. N.W. Ind. 5; FBI. 7 : 46; Bor. Fl. As. 5 : 232; Blatt. & McC. Bomb. Gr. 160, t. 101.

An annual grass. Culms 30-100 cm. high, erect or geniculate at the base, simple or branched, glabrous, leafy. Leaves linear, $15-60 \times 1.2-2.5$ cm., flat, flaccid. Panicles very compound, contracted or thyriform, erect or nodding. Spikelets solitary or in pairs, 2-3.5 mm. long, ellipsoid or ovate-acute. Involucral glumes unequal. Lower floret neuter; upper one hermaphrodite.

Cultivated in the fields of I.A.R.I.; also naturalized.

P. antidotale Retz. Obs. 4 : 17, 1786; Duthie, op. cit. 2; FBI. 7 : 52; Blatt. & McC. Bomb. Gr. 163, t. 104; Bor. Grasses Ind. 322.

A tall, glabrous, perennial grass reaching 150 cm. high. Culms solid, woody, terete, smooth; nodes thickened. Leaves $15-60 \times 0.6-2$ cm., linear.

Panicles effuse, pyramidal; branches usually fasciated, filiform, spreading, drooping; branchlets capillary. Spikelets laxly crowded on the branches, about 3×1.5 mm., ovoid, acute. Glumes 4. Styles 2, conspicuous, very plumose.

Cultivated in the fields of I.A.R.I.

Local name : Bansi ; English name : Blue Panicum
Flowers and Fruits : June-Oct.

59. *Halopyrum* Stapf

H. mucronatum (Linn.) Stapf in Hook. Ic. Pl. t. 2448, 1896; FBI. 7 : 328; Bor, Grasses Ind. 516.

Uniola mucronata Linn. Sp. Pl. 104, 1762.

A tall, stout, perennial grass. Culms hard, smooth, woody. Leaves $20-30 \times 3-4$ cm., flat or convolute, very narrow, glaucous. Panicles $30-40$ cm. long, erect or nodding; rachis and branches angular, wiry. Spikelets $13-16$ mm. long, flat, smooth, white or pale yellowish; rachilla silky hairy. Glumes closely distichously imbricate, keeled.

Grown in the hedges of gardens as an ornamental grass.

Flowers : May-June

J. K. Maheshwari, passim in gardens

60. *Poa* Linn.

P. annua Linn. Sp. Pl. 68, 1753; FBI. 7 : 345; Bor, Fl. As. 5 : 68; Stewart, Gr. N.W. Ind. 419.

A tufted, glabrous, prostrate or suberect grass. Leaves linear, flat, flaccid; margins scaberulous. Panicles ovate or lax, up to 8 cm. long, smooth; branches filiform. Spikelets $4-6 \times 2$ mm., oblong, ovate or lower lanceolate, usually green, 3 to 7-flowered. Involucral glumes unequal. Floral glumes oblong, silkily ciliate below along the keel and the outer side nerves. Palea with ciliate keels. Caryopsis oblong.

Common and abundant in the lawns, gardens, parks and bungalow compounds, especially in cool, shady places near hedges and canals. It forms a bright green, handsome turf on the ground, by its dense growth, but soon withers in the summer heat.

Flowers and Fruits : Dec.-March

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